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NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM, HARLEM VALLEY RESERVOIR (INVENTORY--ETC(U)
SEP 80 E O'BRIEN DACW51-79-C-0001

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Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the spillway can pass the PMF flood using only 80% of its capacity. In addition, the stability of the dam is adequate against overturning and sliding.

The following remedial and maintenance actions should be completed within one year:

1. Monitor the seepage on the abutments near the toe of the dam at biweekly intervals with the aid of weirs. In addition, determine the source of the seepage.
2. Clear abutments immediately downstream of the dam of trees and brush.
3. Clean out and maintain clean the seepage collector channel upstream of the valve house on the left abutment.
4. Trim trees and remove brush from tailrace channel of the spillway.
5. Repair deteriorated concrete surfaces on overflow section training walls and caulk joints where the overflow section meets the wall.
6. Repair jammed screen on the intake for the water supply main.
7. Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of all reservoir gates and valves. Document this information for future reference. Also develop an emergency action plan.

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HOUSATONIC RIVER BASIN
HARLEM VALLEY RESERVOIR

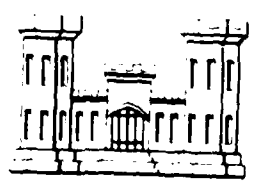
DUTCHESS COUNTY, NEW YORK
(INVENTORY NO. N.Y. 273)

PHASE I INSPECTION REPORT,
NATIONAL DAM SAFETY PROGRAM

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NEW YORK DISTRICT CORPS OF ENGINEERS

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PREFACE

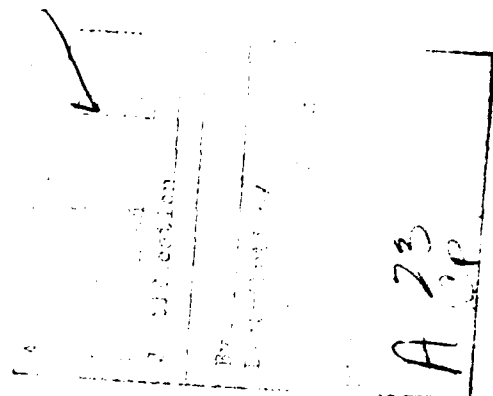
This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C., 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HARLEM VALLEY RESERVOIR DAM
I.D. NO. N.Y. 273
D.E.C. NO. 677
HOUSATONIC RIVER BASIN
DUTCHESS COUNTY, NEW YORK



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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HARLEM VALLEY RESERVOIR DAM
I.D. NO. N.Y. 273
D.E.C. NO. 677
HOUSATONIC RIVER BASIN
DUTCHESS COUNTY, NEW YORK

Name of Dam: Harlem Valley Reservoir (I.D.
No. N. Y. 273)

State Located: New York

County Located: Dutchess

Stream: Tributary of Swamp River

Basin: Housatonic

Date of Inspection: June 12, 1980

ASSESSMENT

Examination of the available documents and visual inspection of the Harlem Valley Reservoir Dam did not reveal conditions which constitute a hazard to human life or property.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the spillway can pass the PMF flood using only 80% of its capacity. In addition, the stability of the dam is adequate against overturning and sliding.

The following remedial and maintenance actions should be completed within one year:

1. Monitor the seepage on the abutments near the toe of the dam at biweekly intervals with the aid of weirs. In addition, determine the source of the seepage.
2. Clear abutments immediately downstream of the dam of trees and brush.
3. Clean out and maintain clean the seepage collector channel upstream of the valve house on the left abutment.
4. Trim trees and remove brush from tailrace channel of the spillway.
5. Repair deteriorated concrete surfaces on overflow section training walls and caulk joints where the overflow section meets the wall.

6. Repair jammed screen on the intake for the water supply main.
7. Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of all reservoir gates and valves. Document this information for future reference. Also develop an emergency action plan.

Eugene O'Brien

Eugene O'Brien, P.E.
New York No. 29823

Approved by:

W. M. Smith, Jr.

Col. W. M. Smith, Jr.
New York District Engineer

Date:

30 Sept 80



1. OVERVIEW OF DAM.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HARLEM VALLEY RESERVOIR DAM
I.D. NO. N.Y. 273
D.E.C. NO. 677
HOUSATONIC RIVER BASIN
DUTCHESS COUNTY, NEW YORK

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the State of New York, Department of Environmental Conservation by letter dated 7 January 1980, in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, 8 August 1972.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property and to recommend remedial measures where required.

1.2 DESCRIPTION OF THE PROJECT

a. Description of the Dam and Appurtenant Structures

The Harlem Valley Reservoir Dam is composed of an approximately 320 foot long concrete gravity dam that includes a centrally located 30 foot wide overflow section serving as a spillway. The crest of the dam is 5 feet wide and its maximum height above river level is 59 feet. The upstream slope of the dam is vertical and the downstream slope varies from vertical nearest the top to 10V on 5H below Elevation 776, to 10V on 6½H below Elevation 756, to 10V on 8H below Elevation 736.

The spillway, which is uncontrolled, has an ogee shaped crest which is about 6 feet below the crest of the dam. There are two 12-inch diameter water supply mains and one 24-inch diameter "blowoff" reservoir drain. Each of the 12-inch diameter water supply mains has a low and high level intake. The intakes for the reservoir drain and the water supply mains are controlled by slide gates on the upstream side of the dam, which are manually controlled within an intake tower located just to the left of the spillway. In addition, the mains and drain can be controlled by a valve located in a valve house at the toe of the dam and just to the left of the spillway outlet channel.

b. Location

Harlem Valley Reservoir Dam is located on a tributary of the Swamp River on the grounds of the Harlem Valley State Hospital near Wingdale, New York. The dam is about one mile east of the intersection of Routes 22 and 55.

c. Size Classification

The dam is 59 feet high and has a reservoir with a maximum storage capacity of 222 acre-feet and therefore is classified as an intermediate dam (height greater than 45 feet).

d. Hazard Classification

The dam is in the "high" hazard potential category because of its close proximity (0.5 mile) to the Harlem Valley State Hospital buildings.

e. Ownership

Harlem Valley Reservoir is owned by New York State Harlem Valley Hospital. The person to contact is Mr. James Billings - Harlem Valley Psychiatric Hospital, Wingdale, New York, 12594, Tel. (914) 832-6611.

f. Purpose of Dam

The dam impounds a pumped storage reservoir used as water supply for the Harlem Valley State Hospital.

g. Design and Construction History

The dam was designed and constructed in 1918 by New York State. The downstream face of the dam and the spillway crest area were treated with pneumatically applied concrete in 1956. Repairs were also carried out on the downstream valve house and the dam in 1970.

h. Normal Operating Procedure

The reservoir is normally kept with the water level at El 776 (spillway crest elevation) by pumping water from the Swamp River. Water is continuously released through one or both of the 12-inch water supply mains to a filter plant used to supply the hospital facility. Average daily usage is 275,000 gallons per day. The 24-inch reservoir drain is opened and cleaned out annually. Complete operation records of inflow and outflow are kept at the filter plant office. Mr. Bill Conklin is the person to contact.

1.3 PERTINENT DATA

a. <u>Drainage Area</u> (sq. mi.)	0.45
b. <u>Discharge at Dam Site</u> (CFS)	
Ungated Spillway at Maximum Pool	1900
Maximum Capacity 12-inch Water Supply Mains	50
Maximum Capacity Reservoir Drain	100
Total Discharge Maximum Pool	2050

c. Elevation (feet above MSL USGS Datum)

Top of Dam	782
Maximum Design Pool	782
Spillway Crest	776
Invert-Water Supply Outlet Intake 1	750
" " " " " 2	750
" " " " " 3	735
" " " " " 4	735
Invert-Reservoir Drain	729

d. Reservoir

Length of Normal Pool (feet)	550
Surface Area of Maximum Pool, Acres	16.4
Surface Area of Normal Pool, Acres	7.4

e. Storage (acre-feet)

Reservoir at Spillway Crest	155
Reservoir at Maximum Pool	222

f. Dam

Type	Concrete gravity
Length (feet)	320
Upstream Slope	Vertical
Downstream Slope	Varies - Vertical to 10V:8H
Crest Elevation (MSL)	782
Crest Width (feet)	5
Grout Curtain	None (according to drawings)

g. Spillway

Type	Ogee - Section of Dam
Length (feet)	30
Crest Elevation (MSL)	776
Upstream Channel	None
Downstream Channel	20 feet wide -

h. Reservoir Drain and Pipelines

Upstream - An intake tower is located immediately adjacent and to the left of the spillway. There are four intakes at two levels serving two water supply mains (one intake at each level per water supply main). An additional intake serves the 24-inch diameter reservoir drain.

Downstream - The outlet for the 24-inch diameter reservoir drain discharges into the spillway channel after passing through a valve house at the toe of the dam. The control for the drain is located in the valve house. The two 12-inch diameter water supply pipes are also controlled in this valve house and they continue downstream to the filtration plant.

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

The records of the owner contain no data on site geology. However, there is data available in the literature on the general geology of the area. The Harlem Valley Reservoir is located in the eastern portion of the New England Upland physiographic province of New York State. The durable metamorphic rocks in the region are reflected in the landforms of significant topographic relief. The rocks at the reservoir site are Precambrian and/or Lower Paleozoic biotite quartz gneiss of the Waramaug Formation.

2.2 SUBSURFACE INVESTIGATIONS

A limited amount of subsurface investigations were carried out prior to construction of the dam. Nine wash borings were carried out and the logs are shown in Appendix A. In addition, it is known that surficial soils in the vicinity of the Harlem Valley Reservoir are of the Charlton-Hollis-Woodbridge Association. These deep (Charlton and Woodbridge) and shallow (Hollis) soils are associated in hilly areas. The materials are developed on glacial till derived from schist and gneiss.

2.3 DAM AND APPURTENANT STRUCTURES

There is a complete set of contract drawings for the dam and appurtenant structures available in the records of the owner. A selection of these are included in Appendix A. In addition, drawings showing the repair work carried out in 1956 and 1970 are available and are included in Appendix A.

2.4 CONSTRUCTION RECORDS

No information has been located with regard to the original and subsequent construction of the dam.

2.5 OPERATION RECORDS

There are complete operation records available for at least the last 20 years. Records of inflow, outflow and maintenance are kept on a daily basis for the reservoir. Periodic maintenance is done for the dam and appurtenant structures by the owner.

2.6 EVALUATION OF DATA

There is sufficient data available to support a Phase I evaluation of the dam.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The visual inspection of the Harlem Valley Reservoir was made on June 12, 1980. The weather was fair and the temperature was 65-70°F. The reservoir was at about spillway crest (El. 776).

b. Main Dam and Appurtenant Structures

The main dam shows no signs of major distress or structural problems. The vertical and horizontal alignment of the crest appears to be unchanged. There are no major cracks in the concrete or joints on the dam or spillway sections. However, the following adverse conditions were noted:

1. There is minor seepage (≈ 3 gpm) in both abutments, just downstream of the dam. There is no indication of fines being washed from the abutments.
2. There is spalling of the concrete at almost all joints on the downstream face of the dam.
3. The abutments immediately downstream of the dam are heavily overgrown and obscure slope and seepage conditions.
4. The pneumatically applied concrete is only in fair condition in spots near the base of the dam.
5. The channels constructed to route seepage near the valve house are clogged. As a result, the water from seepage collects just upstream of the valve house, saturating the ground and flooding the bottom level of the valve house.
6. Concrete surfaces at the junction of the overflow section training wall and the overflow section are deteriorated due to ice damage.

c. Spillway and Tailrace

The crest of the spillway, which was repaired with pneumatically applied concrete, appears to be in generally good condition. The downstream face, however, was also covered with pneumatically applied concrete and is not in good condition. The condition of the spillway face becomes increasingly worse lower on the spillway. In the uppermost sections the pneumatically applied concrete is bubbled and uneven. Lower down it becomes spalled and irregular with sections missing and some minor seepage emanating from beneath it. Near the base the pneumatically applied concrete is gone altogether and the face of the spillway is wet.

The tailrace channel of the spillway is heavily overgrown and choked with fallen trees and brush.

d. Reservoir Drain and Pipelines

The upstream regulating gates of the water supply mains and the reservoir drain are in good operating condition with the exception of a "jammed" screen on one of the intakes for the water supply main. This however does not effect the opening and closing of the gates. The downstream valves are also in good operating condition.

e. Reservoir Area

There are neither slides, rockfalls, sloughing or other signs of instability in the vicinity of the dam. There are no objectionable amounts of floating debris in the reservoir.

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the investigations reveal several deficiencies which should be corrected before further deterioration results in a hazardous condition. The deficiencies and recommended measures to improve these in the order of importance are as follows:

1. Monitor the seepage on the abutments near the toe of the dam at biweekly intervals with the aid of weirs. In addition, determine the source of the seepage.
2. Clear abutments immediately downstream of the dam of trees and brush.
3. Clean out and maintain clean the seepage collector channel upstream of the valve house on the left abutment.
4. Trim the trees and remove the brush from tailrace channel of the spillway.
5. Repair the jammed screen on the intake for the water supply main.
6. Repair deteriorated concrete surfaces on overflow section training walls and caulk joints where the overflow section meets the wall.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The Harlem Valley Reservoir is used continuously to supply water to the Harlem Valley State Hospital. Water is released continuously from the reservoir through one or two 12-inch diameter water supply mains. The reservoir is maintained at spillway crest level by continuous pumping from the Swamp River. In addition, the 24-inch diameter reservoir drain is operated periodically to flush out sediment. Both the water supply and reservoir drain are controlled upstream from an intake tower with slide gates and a manual hoist, downstream control is by valves located in a valve house at the toe of the dam. Slide gates are operated at various times, but on no set schedule. The spillway is uncontrolled. Complete inflow and outflow operating records are available in the filtration plant near the dam.

4.2 MAINTENANCE OF THE DAM

There is no regular maintenance schedule for the dam. The dam is continuously 'looked at' by the maintenance staff of the Hospital.

4.3 WARNING SYSTEM IN EFFECT

There are no warning systems in effect or in preparation.

4.4 EVALUATION

The overall maintenance of the Harlem Valley Reservoir is considered inadequate in the following areas:

1. Collector channels for seepage on the left abutment downstream of the dam are clogged causing seepage to enter the valve house.
2. Control of trees and vegetation on the abutments immediately downstream of the dam and in the spillway tailrace channel.
3. No formal operation and maintenance manuals exist for the project.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Harlem Valley Reservoir Dam is located south of Dover Plains in Dutchess County, New York, Hydrologic Unit Code 01100005. The watershed contributing to the reservoir is 0.45 square miles (285.7 acres) and consists mainly of undeveloped wooded mountain slopes with a relatively large area of swamp indicated on the USGS Dover Plains quadrangle. There are no defined water courses in the basin and the surface runoff stored by the reservoir is supplemented by water pumped from downstream of the dam. Slopes in the watershed range between 5 and 10 percent with elevations rising from a lake level of 776 to peaks above 920.

5.2 ANALYSIS CRITERIA

The analysis of the Harlem Valley Reservoir Dam was performed using the U. S. Army Corps of Engineers HEC-1 computer program (Ref. 1). Because of the small drainage area size, it was assumed that the basin runoff equals the excess rainfall. The Probable Maximum Precipitation (PMF) obtained from Hydrometeorological Report No. 51 (Ref. 4) was distributed over a 24 hour period and converted to runoff. It was estimated that there would be a constant rainfall loss of 0.1 inch per hour over the land area. No losses were calculated for rain falling directly on the water surface.

5.3 SPILLWAY CAPACITY

The principal spillway of Harlem Valley Reservoir Dam is centrally located on the dam, 30.0 feet in length with its ogee crest at El 776 MSL. The computed discharge with water surface at El 782 (top of dam) is 1900 cfs.

5.4 RESERVOIR CAPACITY

The normal capacity of the Harlem Valley Reservoir is reported to be 155 acre-feet. Surcharge storage between El 776 (spillway crest elevation) and the top of the dam, El 782, is 67 acre-feet, which is equivalent to 2.8 inches of runoff over the entire drainage basin. Maximum or total capacity of the reservoir is 222 acre-feet.

5.5 FLOODS OF RECORD

There are no available records of the floods or maximum reservoir elevations resulting from floods.

5.6 OVERTOPPING POTENTIAL

The potential of the dam being overtopped was investigated on the basis of the spillway capacity and the available surcharge

storage to meet the computed design flood inflows. The inflow peak of the Probable Maximum Flood (PMF), computed by converting rainfall excess to runoff was 1972 cfs. The PMF hydrograph routed through the reservoir resulted in a peak outflow of 1549 cfs, and a corresponding reservoir surface elevation of 781.1 which does not overtop the dam. One-half the PMF raised the reservoir surface to 779.2 MSL with a peak outflow of 720 cfs.

5.7 EVALUATION

The computed PMF outflow is approximately 77% of the spillway capacity, and the spillway is, therefore, assessed as adequate.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observations did not indicate existing problems with the structure of the dam. The seepage observed in the abutments of the dam is not considered to represent an unstable or otherwise dangerous condition at the present time.

b. Design and Construction Data

The original preconstruction design computations regarding the structural stability of the dam are not available. There are contract drawings showing the design and details of the structure in Appendix A.

c. Stability Analysis

A structural stability analysis of spillway section of the structure was performed using design sections shown in the contract drawings. The following table shows the loading cases considered and the results of the analysis. Detailed analysis is shown in Appendix E.

<u>Loading Condition</u>	<u>Overturning</u>	<u>Sliding Factor of Safety</u> <u>(See Appendix E)</u>
I) Normal Loading Condition: Reservoir Level at Spillway Crest; no ice load	Within Middle Third	2.55
II) Normal Loading Condition: Reservoir Level at Spillway Crest; with ice load (5 kips)	Within Middle Third	2.43
III) Unusual Loading Condition: One-half PMF Reservoir Level at El 779.1, water flowing 3.1 ft over spillway	Within Middle Half	2.26
IV) Extreme Loading Condition: PMF Reservoir Level at El 781.1, water flowing 5.1 ft over spillway	Within Middle Half	2.08
V) Unusual Loading Condition: Earthquake Reservoir Level at Spillway Crest, 0.05g earthquake force	Within Middle Half	2.0

On the basis of stability analysis performed during the investigation, the structural stability of the overflow section of the dam against overturning was determined to be adequate for all cases. The structural stability of the dam against sliding was determined to be adequate for all cases.

d. Operating Records

Operation records which are available for the project did not indicate any operational problems, which would affect the stability of the dam.

e. Post-Construction Changes

Two post-construction changes have been carried out both of which only indirectly effect the stability of the dam. Pneumatically applied concreting was carried out in 1956 for the purpose of reducing seepage on the dam. This appears to have been moderately successful; however, the concrete has since deteriorated and is now in only fair condition. The second post-construction change was the construction of concrete seepage collectors on the left abutment near the toe of the dam. Neither of these changes have an effect on the stability of the dam.

f. Seismic Stability

The dam is located in Zone 2; therefore, a stability analysis was carried out using a normal reservoir loading (water level at spillway crest) and a 0.05g earthquake factor. The results of the analysis showed the dam to be safe under both overturning and sliding.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of available documents and the visual inspection of the Harlem Valley Reservoir Dam and appurtenant structures did not reveal any conditions which constitute a hazard to human life or property. The dam is not considered to be unsafe.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the spillway can pass the PMF flood using only 80% of its capacity. The dam has an adequate factor of safety against overturning and sliding for all loading conditions.

b. Adequacy of Information

The information and data available were adequate for performance of this investigation.

c. Need for Additional Investigations

No additional investigations are required.

d. Urgency

The recommended measures as described below must be completed within one year from notification.

7.2 RECOMMENDED MEASURES

1. Monitor the seepage on the abutments near the toe of the dam at biweekly intervals with the aid of weirs. In addition, determine the source of the seepage.

2. Clear abutments immediately downstream of the dam of trees and brush.

3. Clean out and maintain clean the seepage collector channel upstream of the valve house on the left abutment.

4. Trim trees and remove brush from tailrace channel of the spillway.

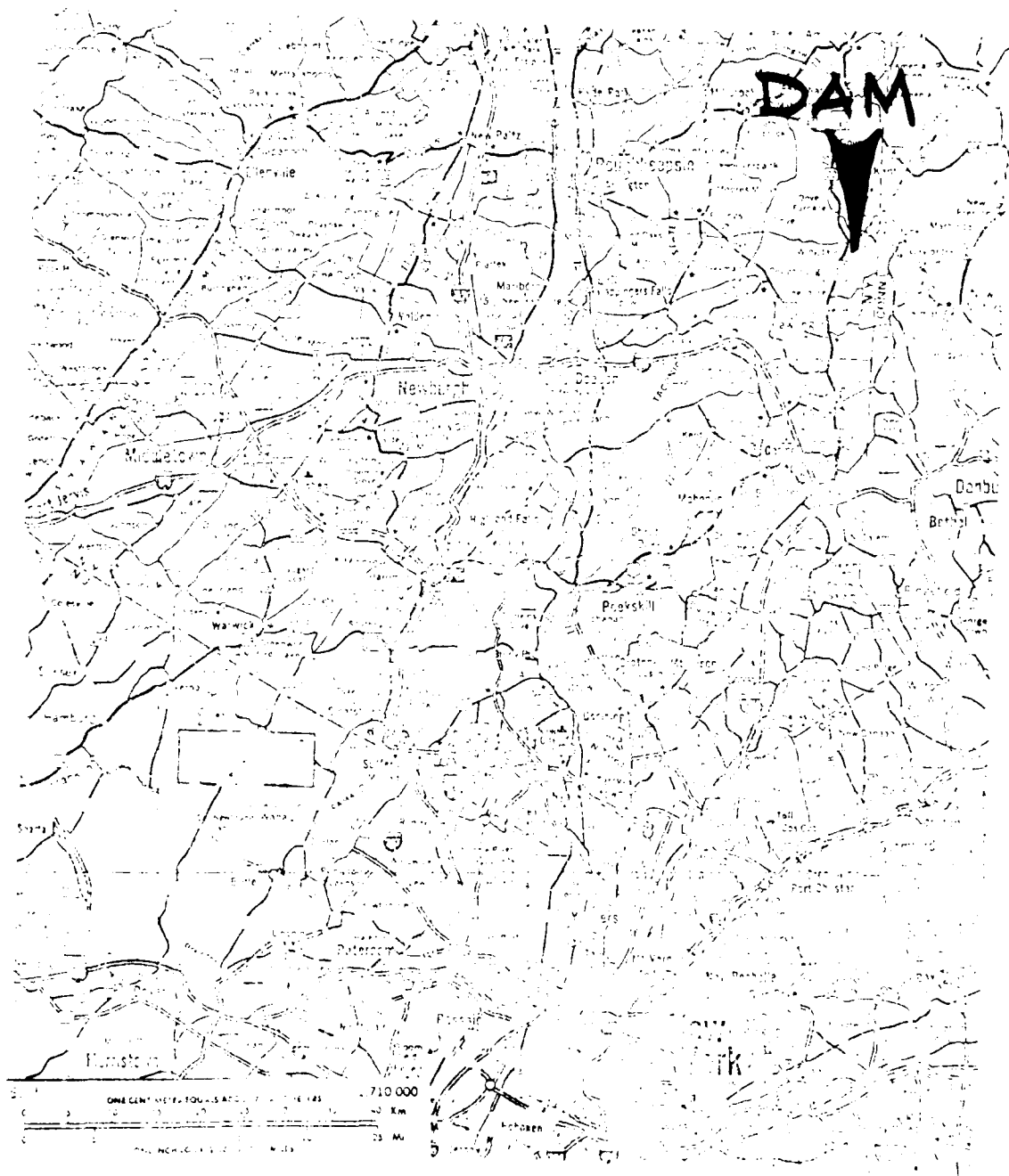
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7. Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of all reservoir gates and valves. Document this information for future reference. Also develop an emergency action plan.

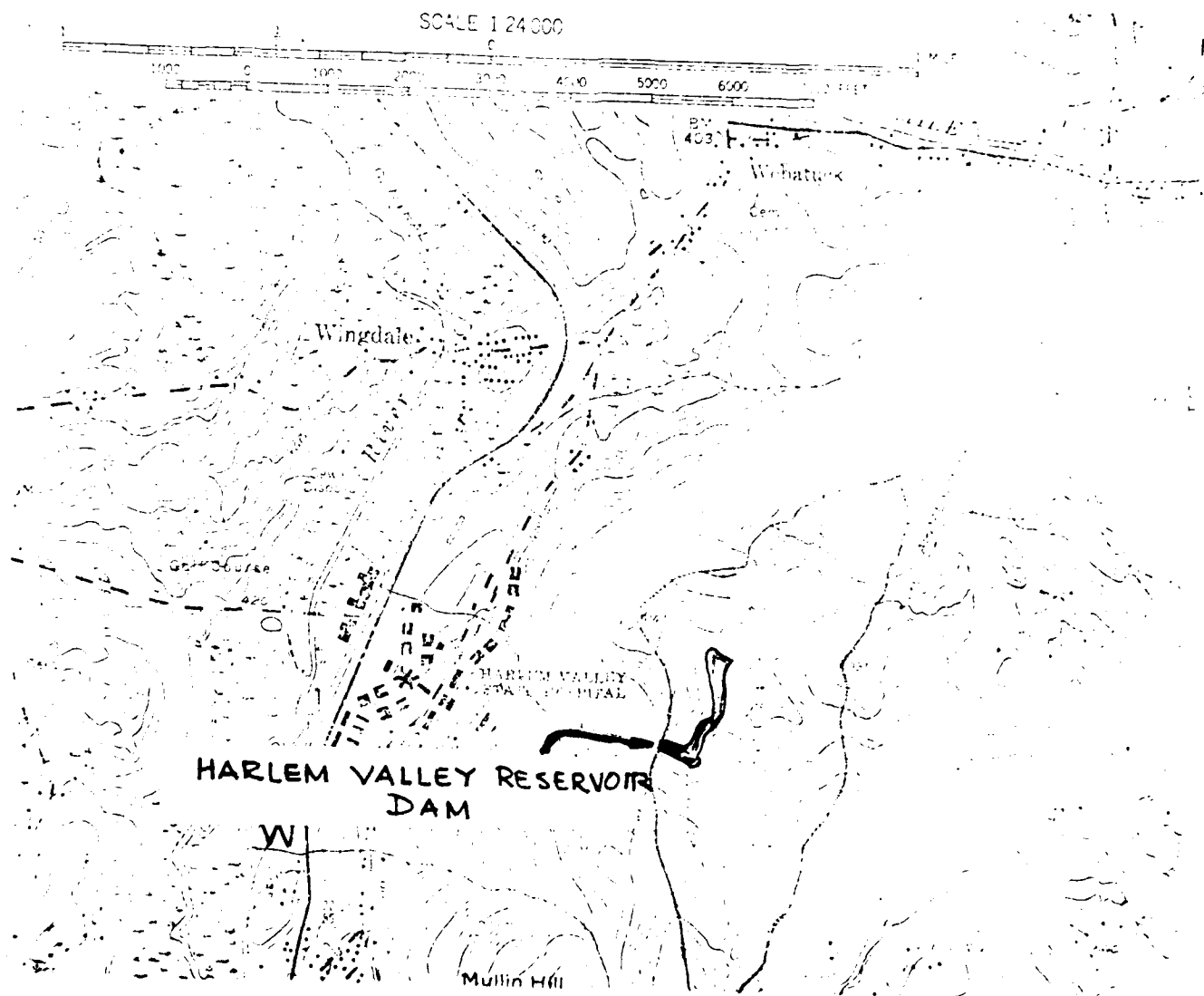
DRAWINGS

APPENDIX A

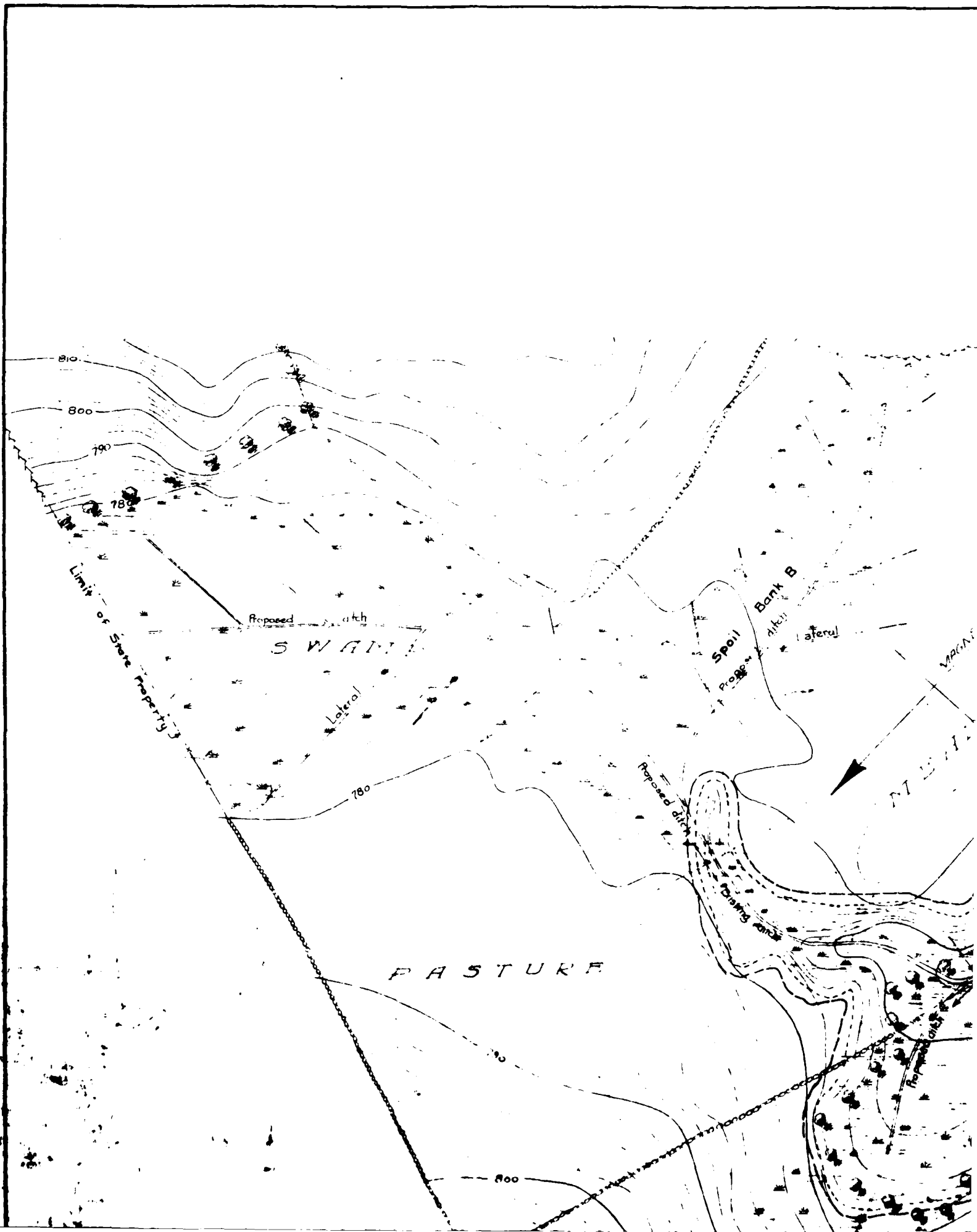


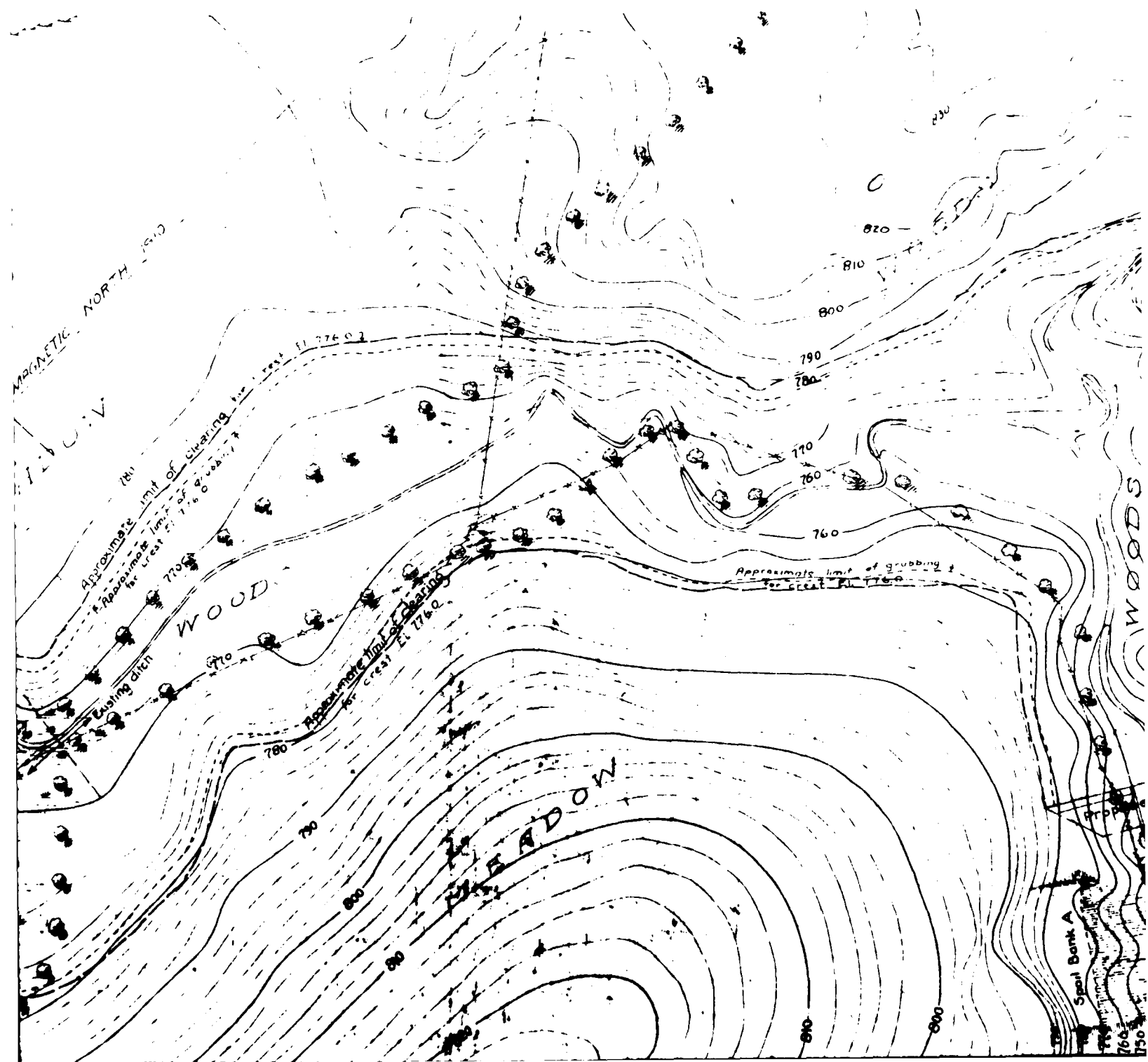
VICINITY MAP
HARLEM VALLEY RESERVOIR DAM

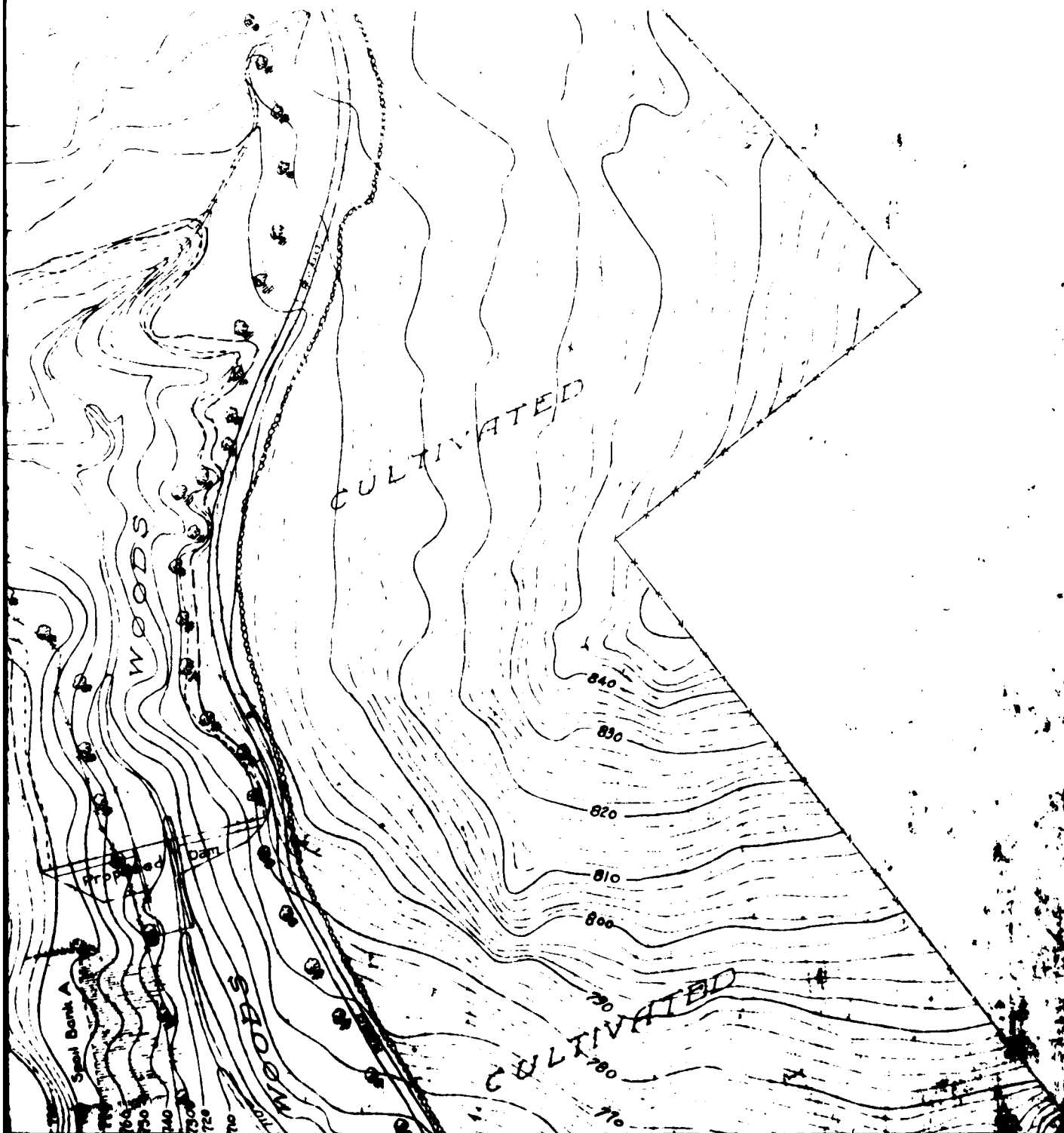
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New York - New Jersey

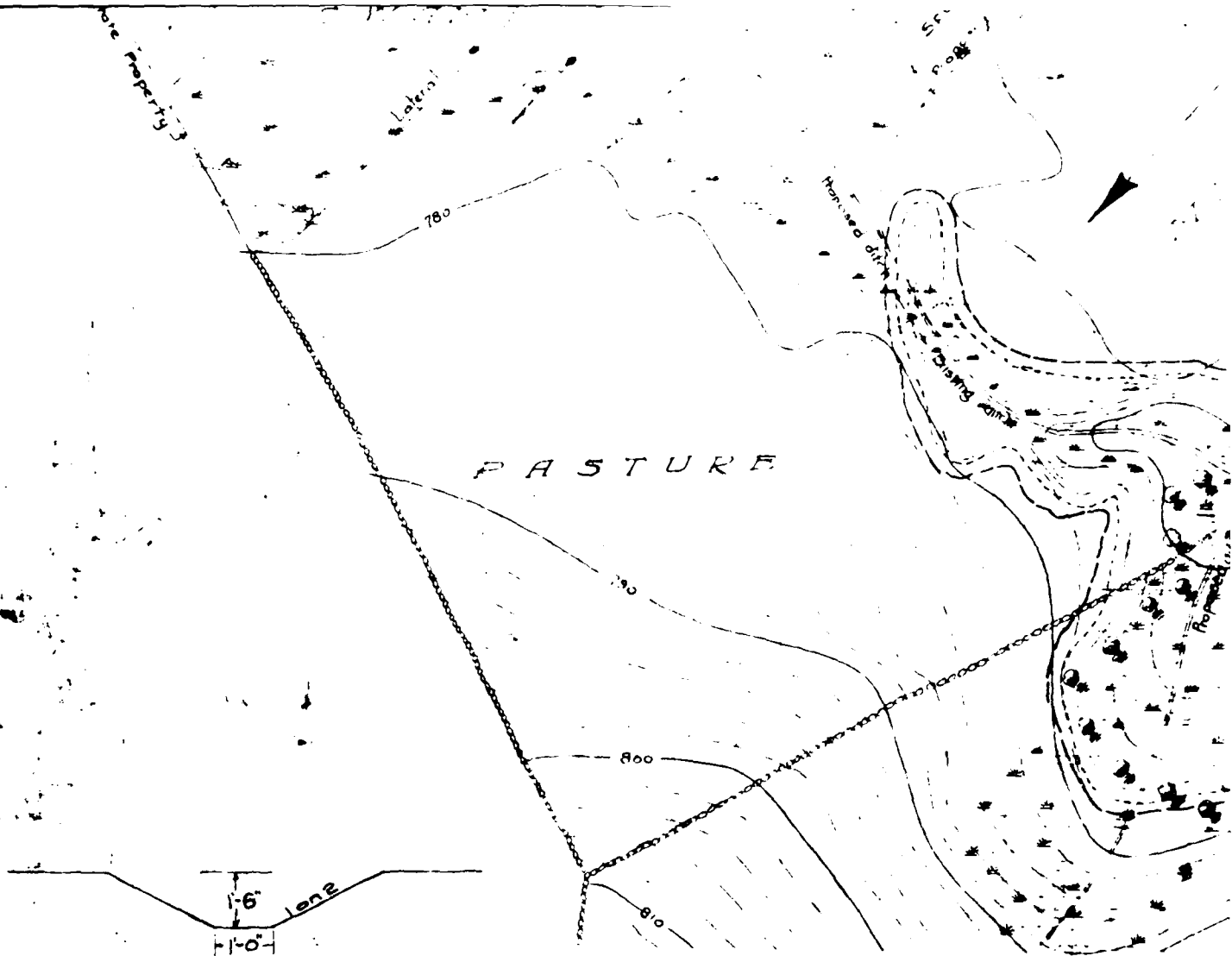


TOPOGRAPHIC MAP
HARLEM VALLEY RESERVOIR DAM









SECTION OF DITCH
AND LATERALS.

NOTE- The section and location
of ditch may be modified to suit
conditions as directed by the
Engineer. Ditches will be omitted
where swamp is eliminated by filling
with spoil

Clearing, grubbing or ditching

General limit of grubbing shall be ten feet horizontal
general limit of clearing shall be twentyfive feet
outside future flow line at El 776.0.

NEW YORK STATE DEPARTMENT OF MEAL

Henry W. V. Marsh, Jr.

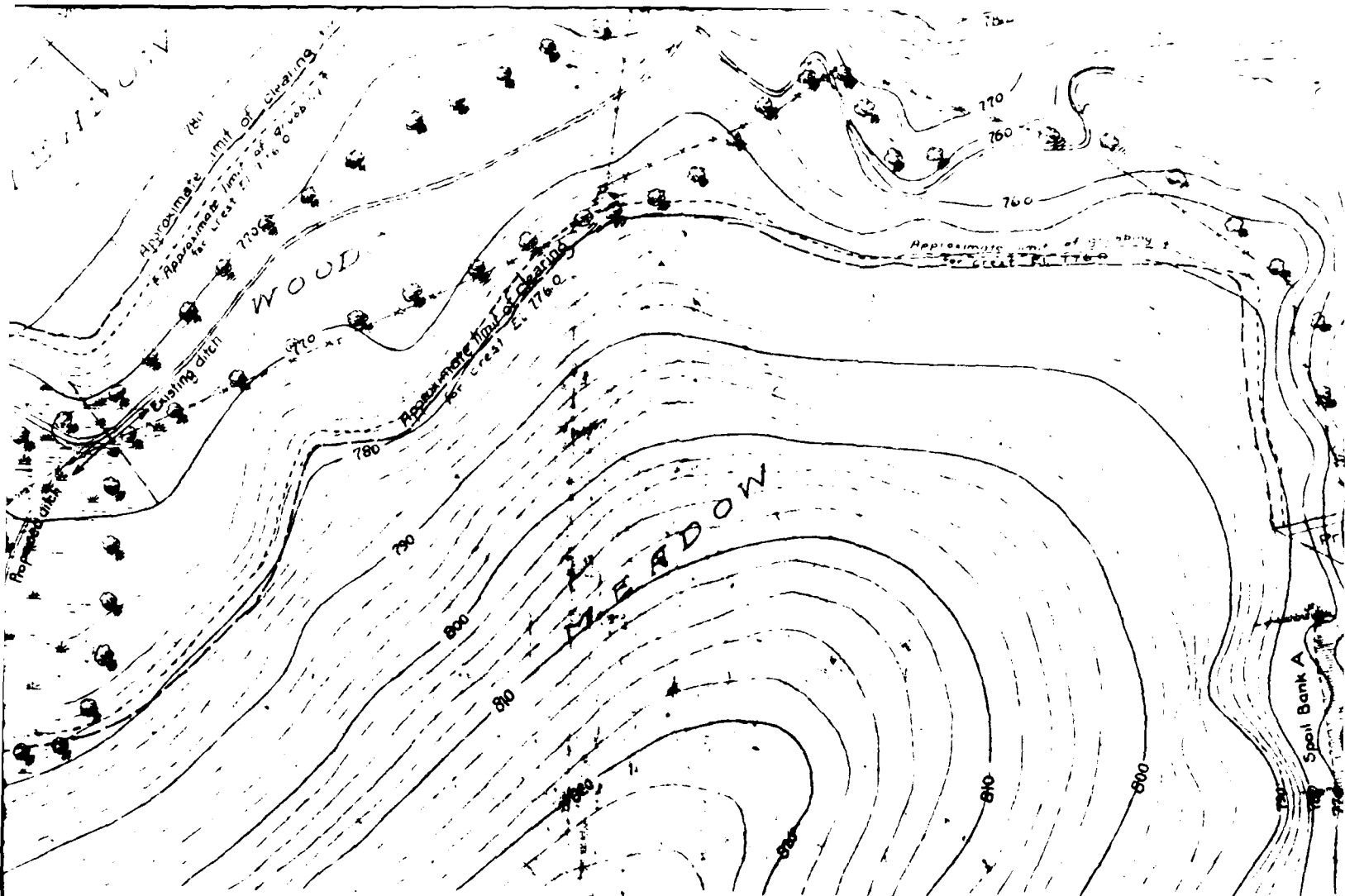
That due to Water Supply System for
Prison, Sing Sing, N.Y.
on land owned by the State of New York
in the County of Westchester, N.Y.
the following work is to be done:

H. Russell
Chief Engineer

Traced by H.W. Bencher, Aug 31, 1917.

1st Check by H.G. Brown, Sept 7, 1918

2nd Check by H.G. Brown, Sept 10, 1918 (Revisions)

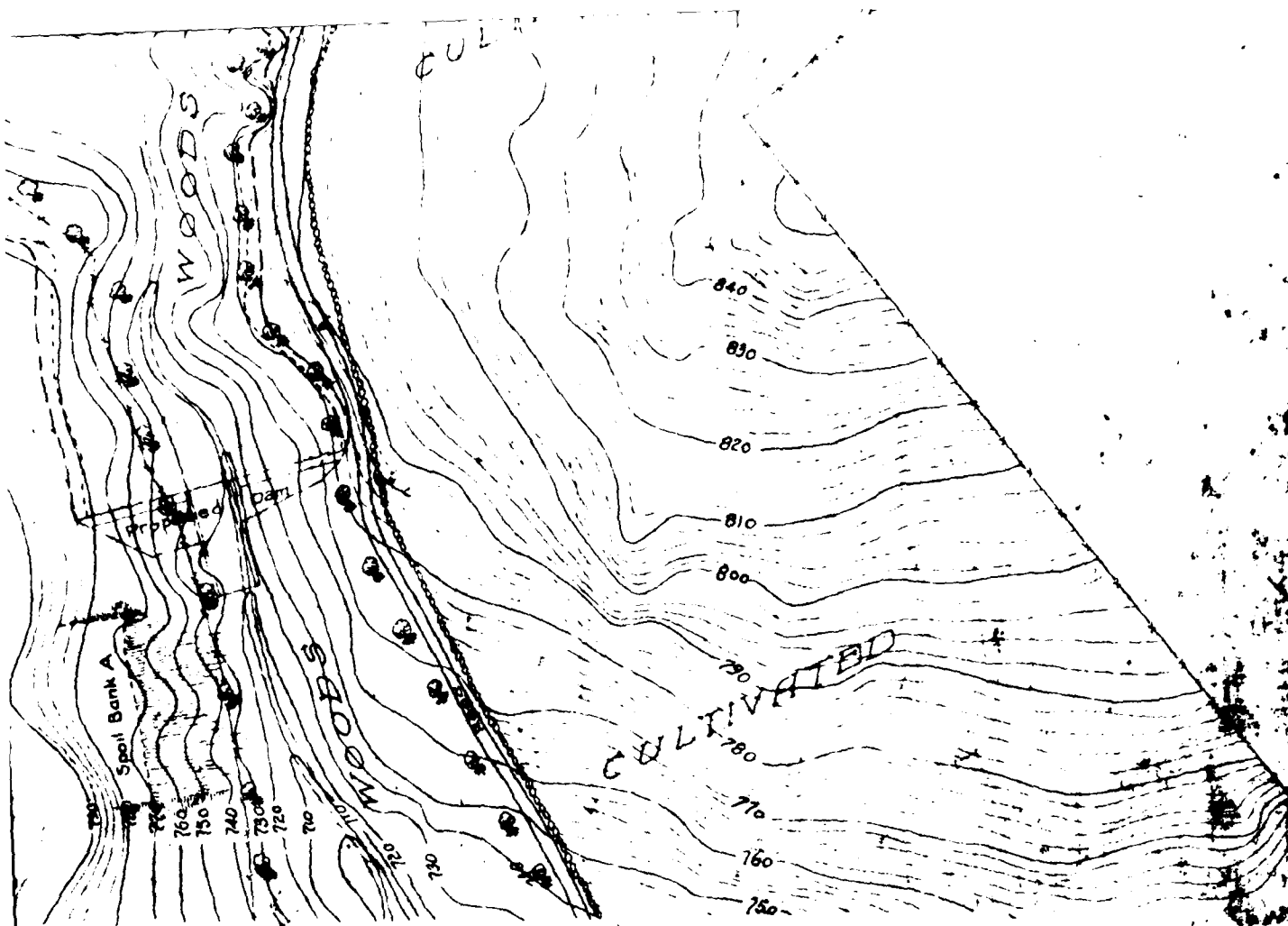


ing of reservoir site will not be done under this contract.

horizontally and
e feet horizontally

Spoil bank A is for spoil from excavation for dam.
Limits indicated are approximate only. Top El 784 ±.
Side slopes 2 on 3. Volume 5300 ± Cu. Yds.
Top and sides of spoil bank to be covered with at
least 6 inches of top soil obtained by grubbing.

Spoil bank B. Material grubbed is to be spoiled over
this swampy swale. Top of spoil is to join adjacent
hill sides without abrupt slopes. Spoil is to be
graded to provide easy drainage.



NEW YORK STATE DEPARTMENT OF HEALTH

amended Albany, N. Y. 1919
 Water Supply System for
 Windale Prison, Windale, N. Y.
 1. The map is a plan view of the proposed water supply system for the Windale Prison, showing the location of the dam, the water supply system, and the surrounding terrain.
 2. The map is a plan view of the proposed water supply system for the Windale Prison, showing the location of the dam, the water supply system, and the surrounding terrain.
 3. The map is a plan view of the proposed water supply system for the Windale Prison, showing the location of the dam, the water supply system, and the surrounding terrain.

McNally
 Director of Health

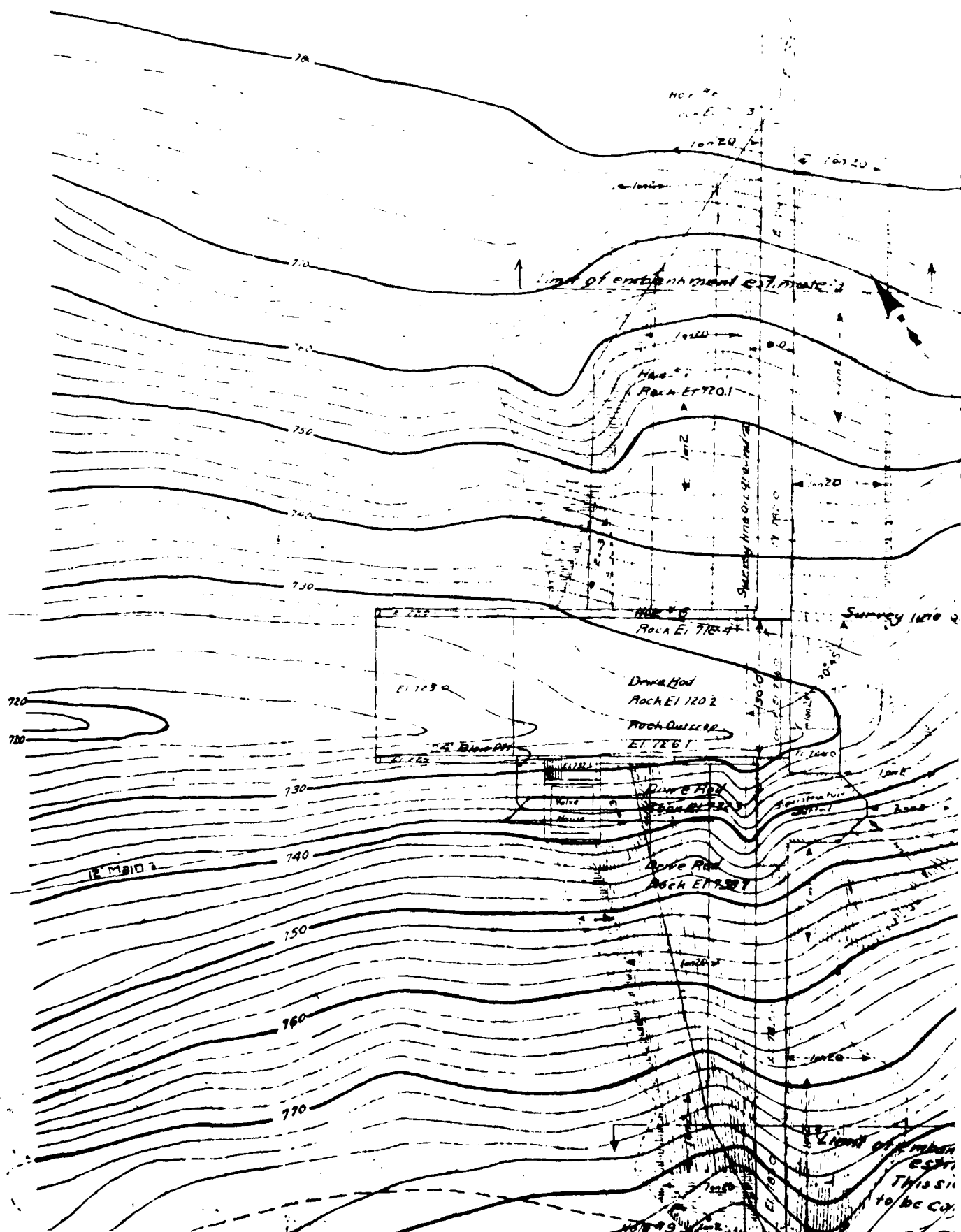
STATE OF NEW YORK

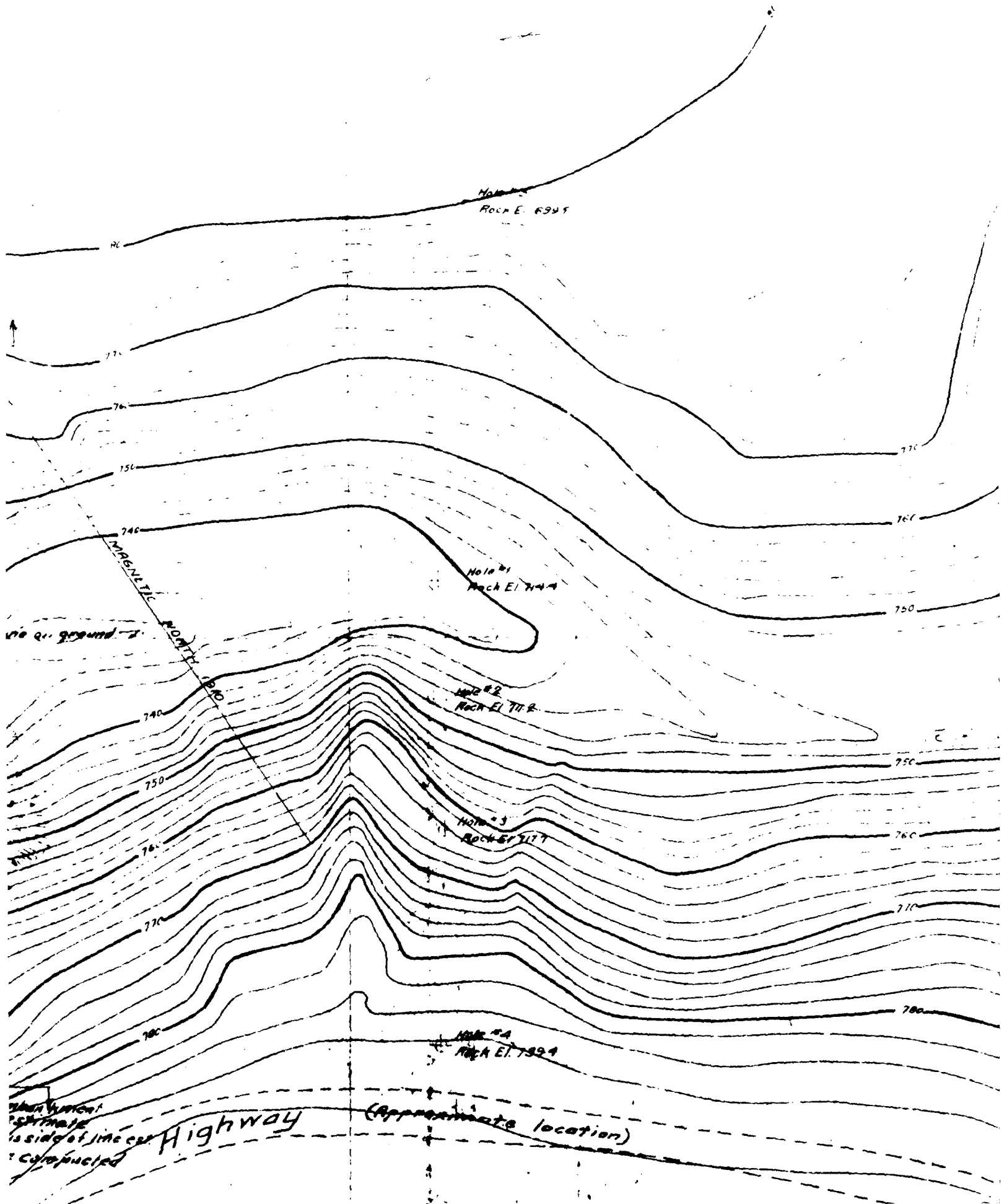
Dam and Water Supply System for
 Windale Prison

GENERAL MAP OF RESERVOIR & DAM

Engineer and Surveyor

Harold
Harold





750

760

770

780

The backfill of foundation pits and the earth backing of dam shall be as directed by the engineer. It shall in general be as follows: Backfill against the faces of dam shall show smooth lines and that on the down stream side shall in all cases be equal to or higher than that at the corresponding point on the upstream face. The backfill on face of dam shall be at such height that the top of the earth backing can be carried out at a downward slope of about 5% normal to the upstream face of the dam for at least 20 ft where possible and then sloped downward at 1 on 2 or flatter to the natural surface at or beyond the edge of the excavation pit. The purpose of the above is to provide ready surface drainage away from the masonry. On the upstream side and in rear of the valve house the backfill shall be sloped up from the intersection of the apron sidewall and the curtain wall at about 2 on 3 until it intersects the 5% slope from the dam. The backfill called for above is indicated with dotted lines on the plan.

1 2 3 4 5 6 7 8 9

75.2
7322
C
G
B
R 114.4

70.5
740.5
L
C
G
B
R 171.2

70.0
701.5
L
C
G
B
R 177

70.8
65.8
L
C
G
B
R 179.4

70.0
70.0
L
G
B

73.4
72.0
5
G
C
G
B
R 120.6

75.4
74.8
5
G
C
G
B
R 170.1

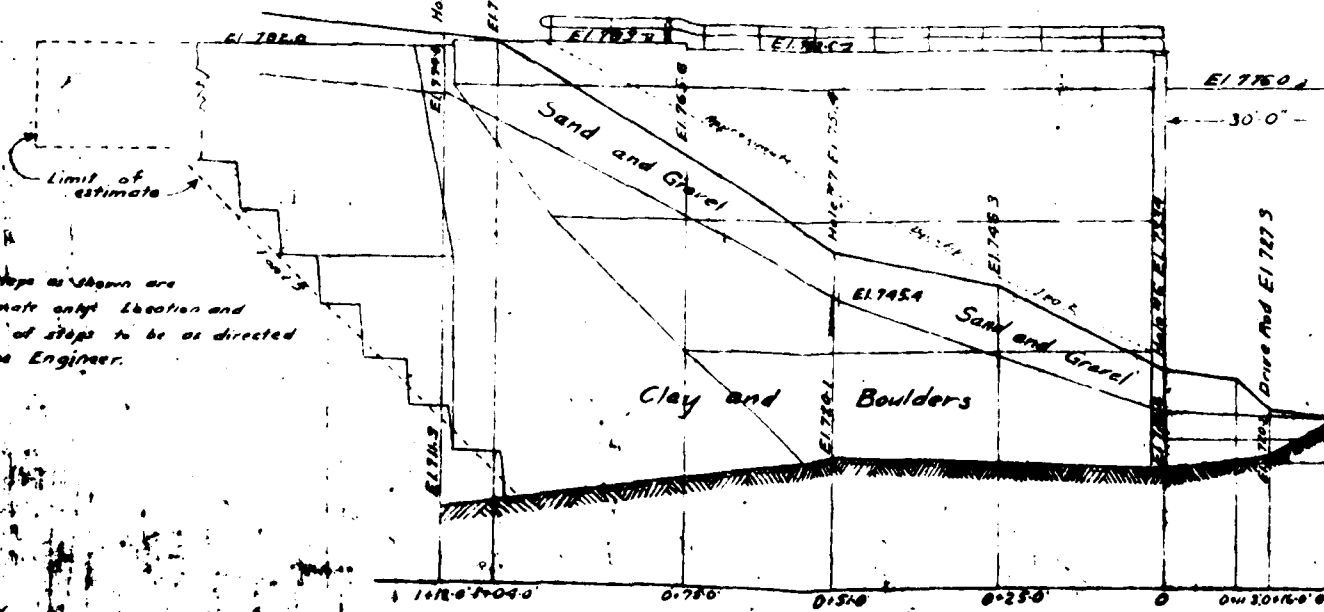
70.8
77.4
9
G
C
G
B
R 171.4

70.8
70.0
L
C
G
B
R 173.4

-Notation-
h denotes boulders
C " clay
G " gravel
L " loam
B " rock
R " sand

-Notation-

B	denotes boulders
C	" clay
G	" gravel
L	" loam
R	" rock
S	" sand



Section along line of Bor

Survey line q. ground -

740

750

760

770

780

790

800

810

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830

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850

860

870

880

890

900

910

920

930

940

950

960

970

980

990

1000

1010

1020

1030

1040

1050

1060

1070

1080

1090

1100

1110

1120

1130

1140

1150

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1170

1180

1190

1200

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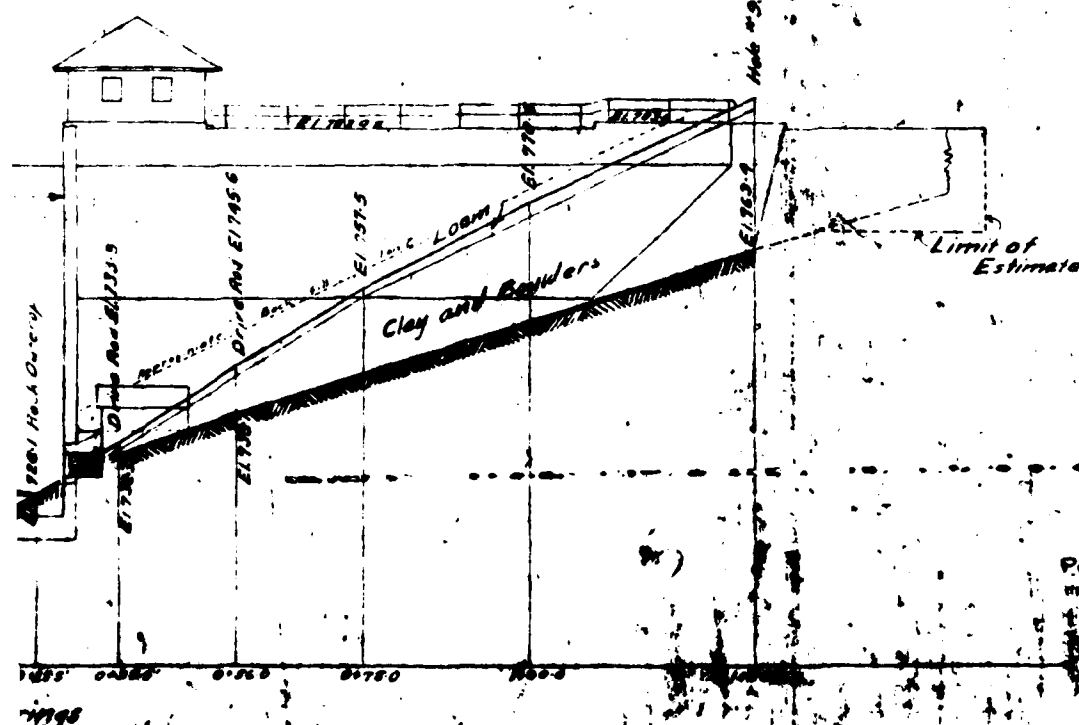
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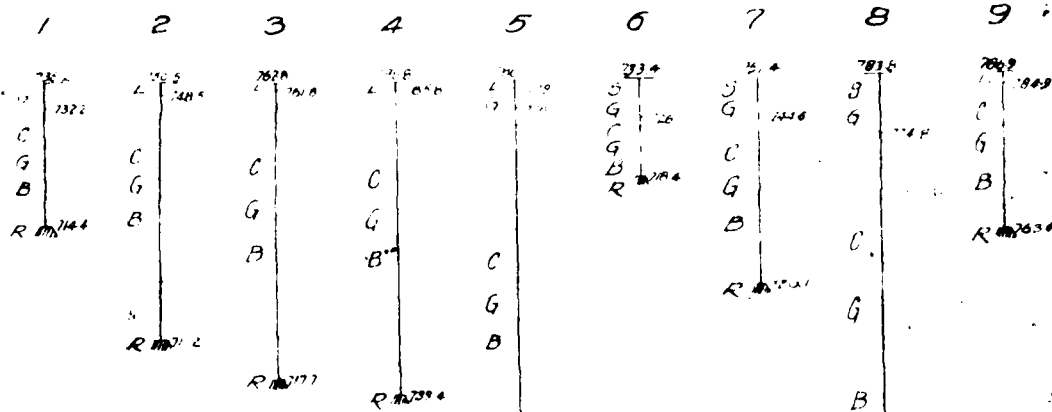
4820</



NOTE.
The base of the structure shown on sheet shall be considered as approximate only and in order to secure a proper foundation shall be of such dimensions and at such elevations as may be directed by the Engineer.

NEW YORK STATE DEPARTMENT OF CORRECTIONS
Albany, N.Y. March 4, 1934
Hon. J. W. McCarty, Supply System for the
Prisons, Buffalo, N.Y.
Dear Sir: I have the honor to acknowledge the receipt of your letter of the 28th inst. and in response to advise you that the same has been forwarded to the proper authorities for their consideration. Very truly yours,
J. W. McCarty
Hon. J. W. McCarty, Supply System for the
Prisons, Buffalo, N.Y.

HOLE NUMBER



-Notation-
 B denotes boulders
 C " clay
 G " gravel
 L " loam
 R " rock
 S " sand
 NOTE. When two or more symbols are given, the material is a mixture.

WASH DRILL BORINGS

NEW YORK STATE DEPARTMENT OF HEALTH

Amended
 THOMAS W. W. Water Supply System for
 Wingdale Prison, Wingdale, N.Y.
 as hereby approved under and is recorded in the records of Section
 14 of Chapter 48 of the Laws of 1903, the "Public Health Law" constituting
 Chapter 48 of the Consolidated Laws of the State of New York of the
 Laws of 1912.

W. McCally
 Deputy State Commissioner of Health

STATE OF NEW YORK Dam and Water Supply System for Wingdale Prison LAYOUT OF DAM

Scale: 1 inch = 20 feet

March 2, 1915

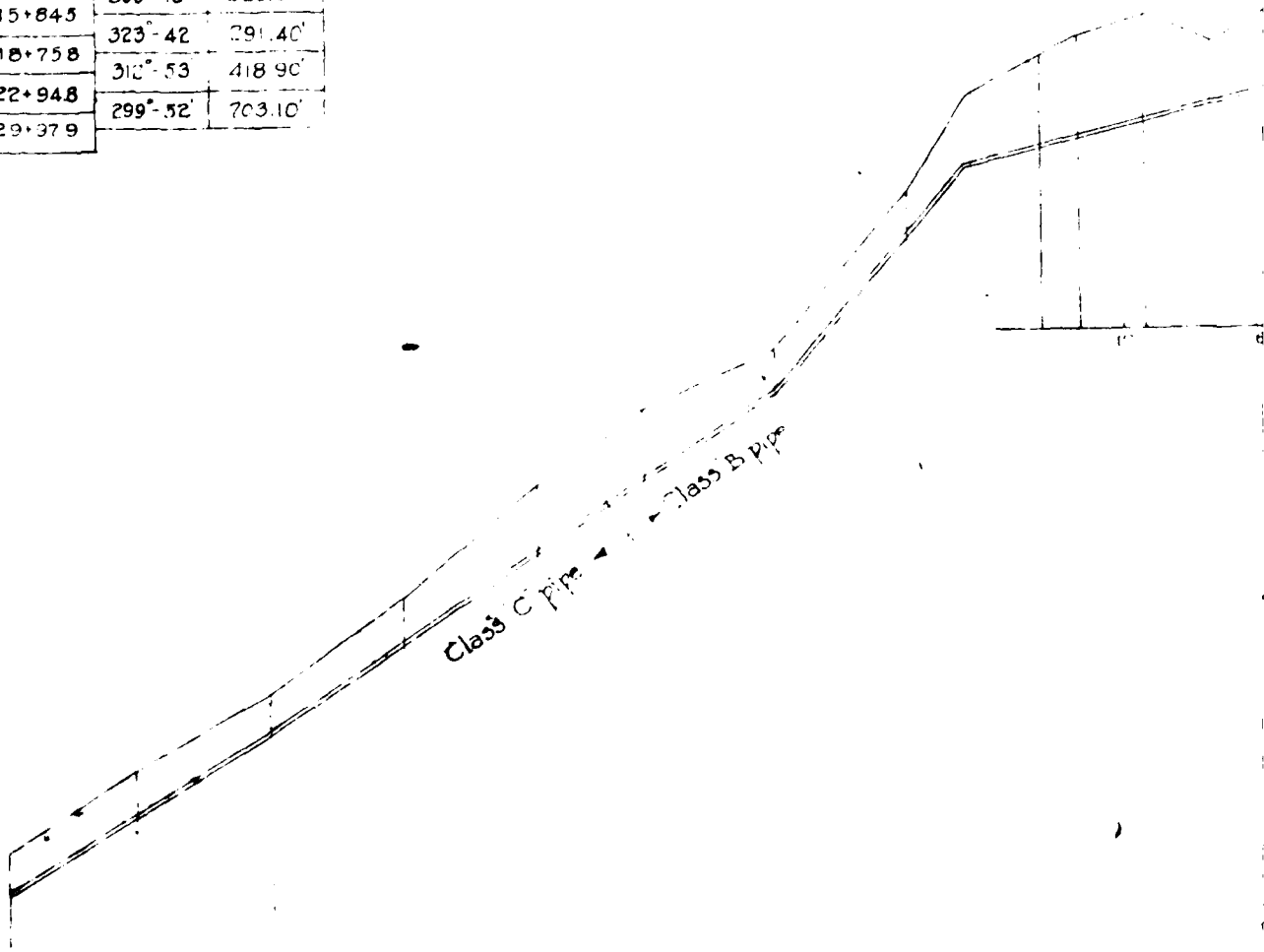
W. McCally
 Deputy State Commissioner of Health

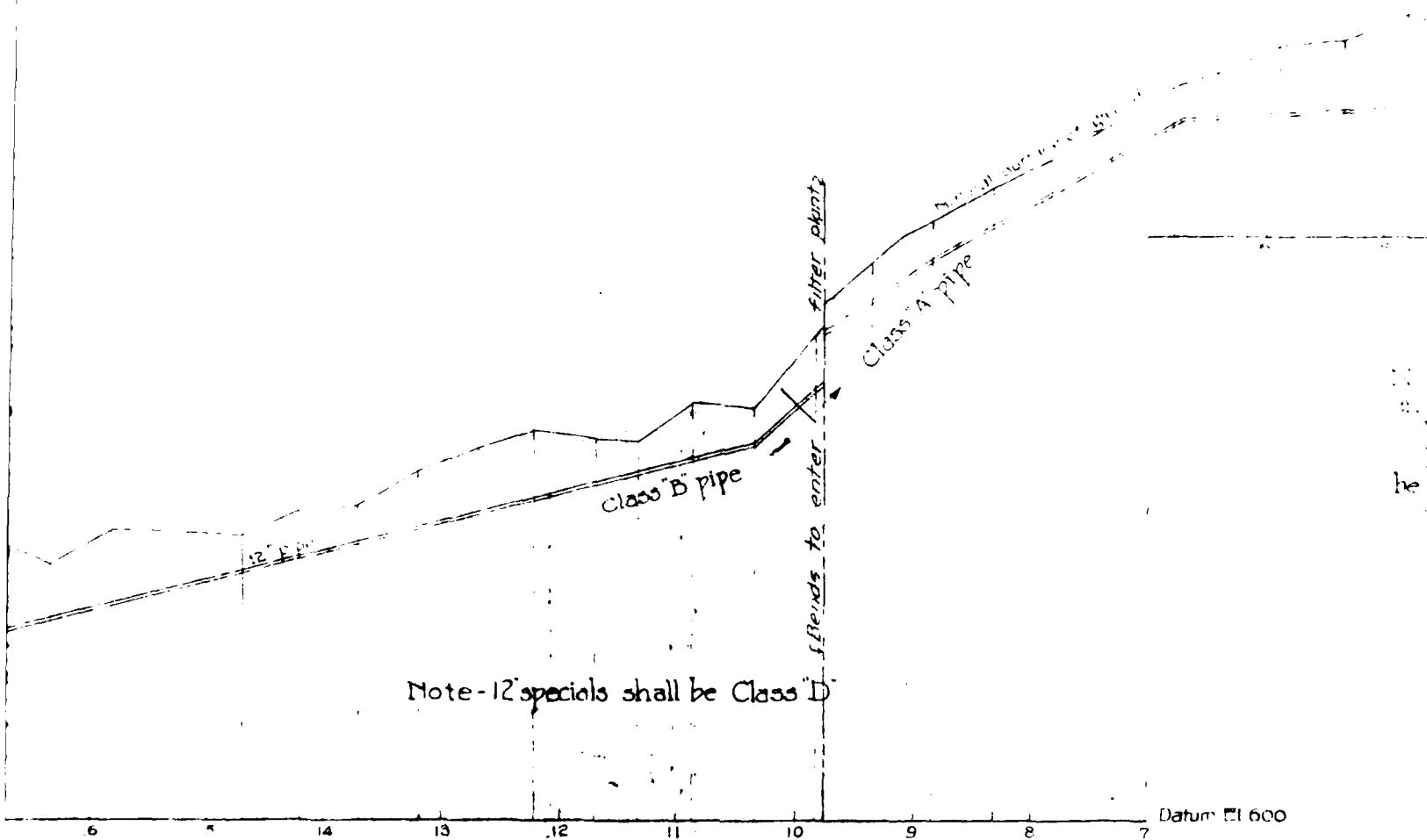
shown on this
 approximate
 proper
 dimensions
 may be

2

BASE LINE DATA

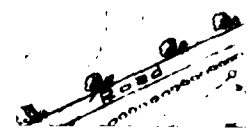
STATION	AZIMUTH	DISTANCE
0+00	274°-31'	109.95
1+10	297°-10'	233.70
3+45.6	288°-37'	123.50
4+45.1	256°-23'	172.80
6+21.9	275°-13'	171.67
7+93.6	273°-16'	465.00
12+58.6	306°-16'	325.90
15+84.5	323°-42'	291.40
18+75.8	310°-53'	418.90
22+94.8	299°-52'	703.10
29+37.9		

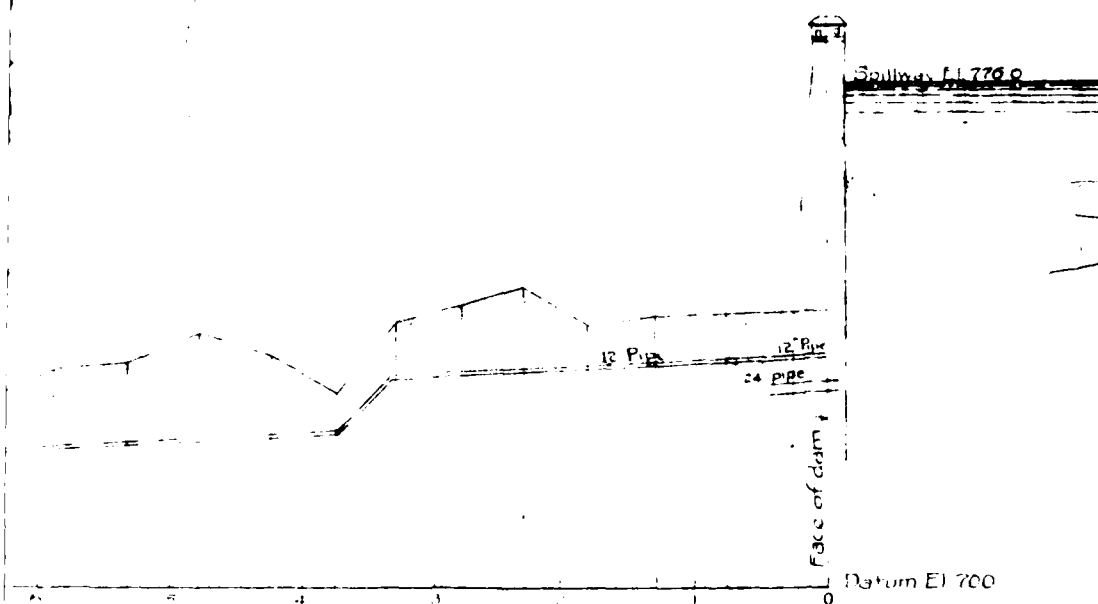




PROFILE ON CENTER LINE OF PIPE

SCALES
 HOR 1 IN = 100 FT
 VER 1 IN = 10 FT



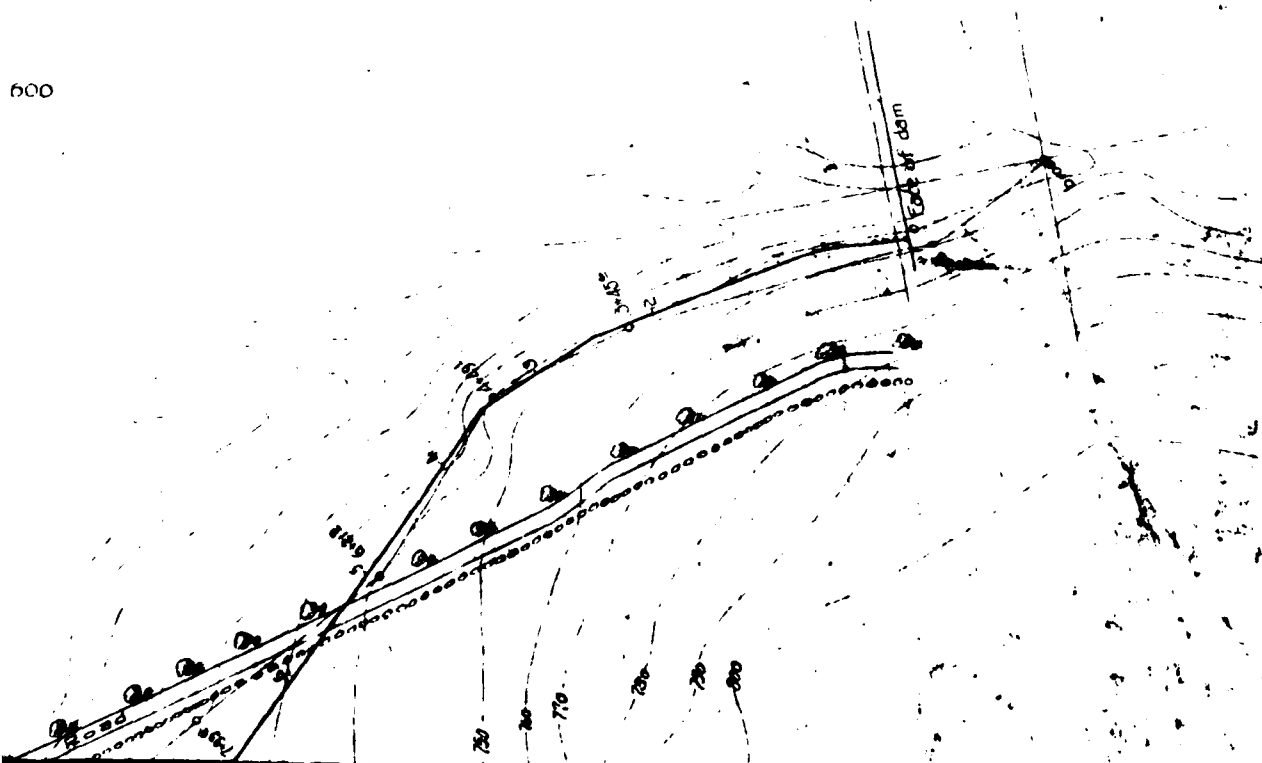


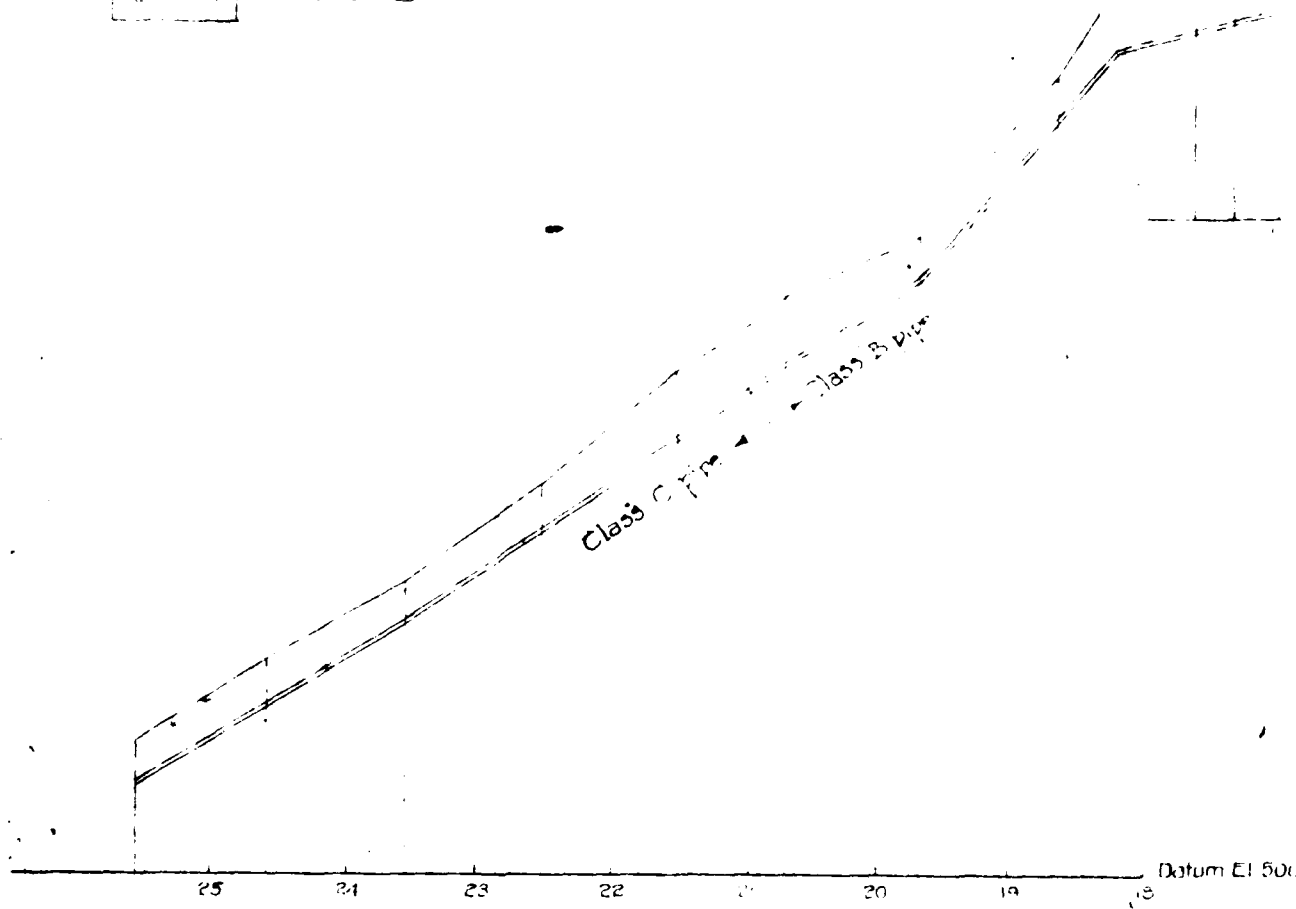
Note - The location of the pipe line as shown is approximate only and may be varied by the Engineer to fit the ground.

Pipe shall have at least five feet of covering.

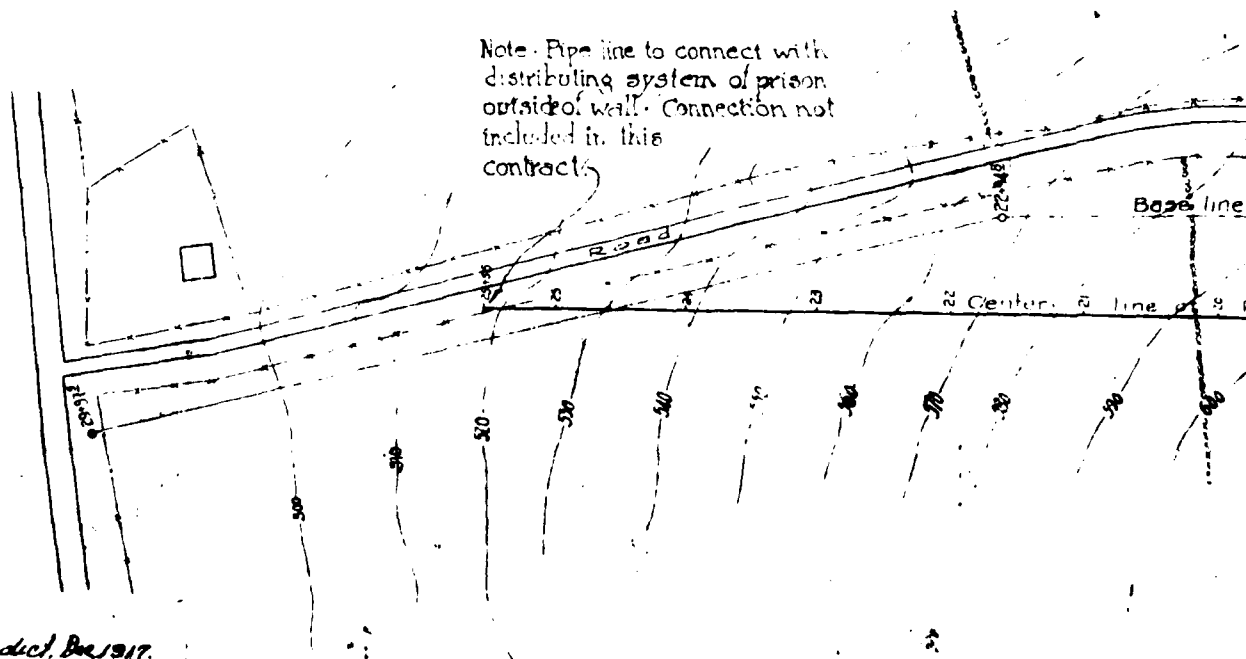
Pipe shall be of the classes shown on the drawing and shall be tested before it is covered (see specifications).

All joints in pipe line are to be leaded





Note: Pipe line to connect with distributing system of prison outside of wall. Connection not included in this contract.



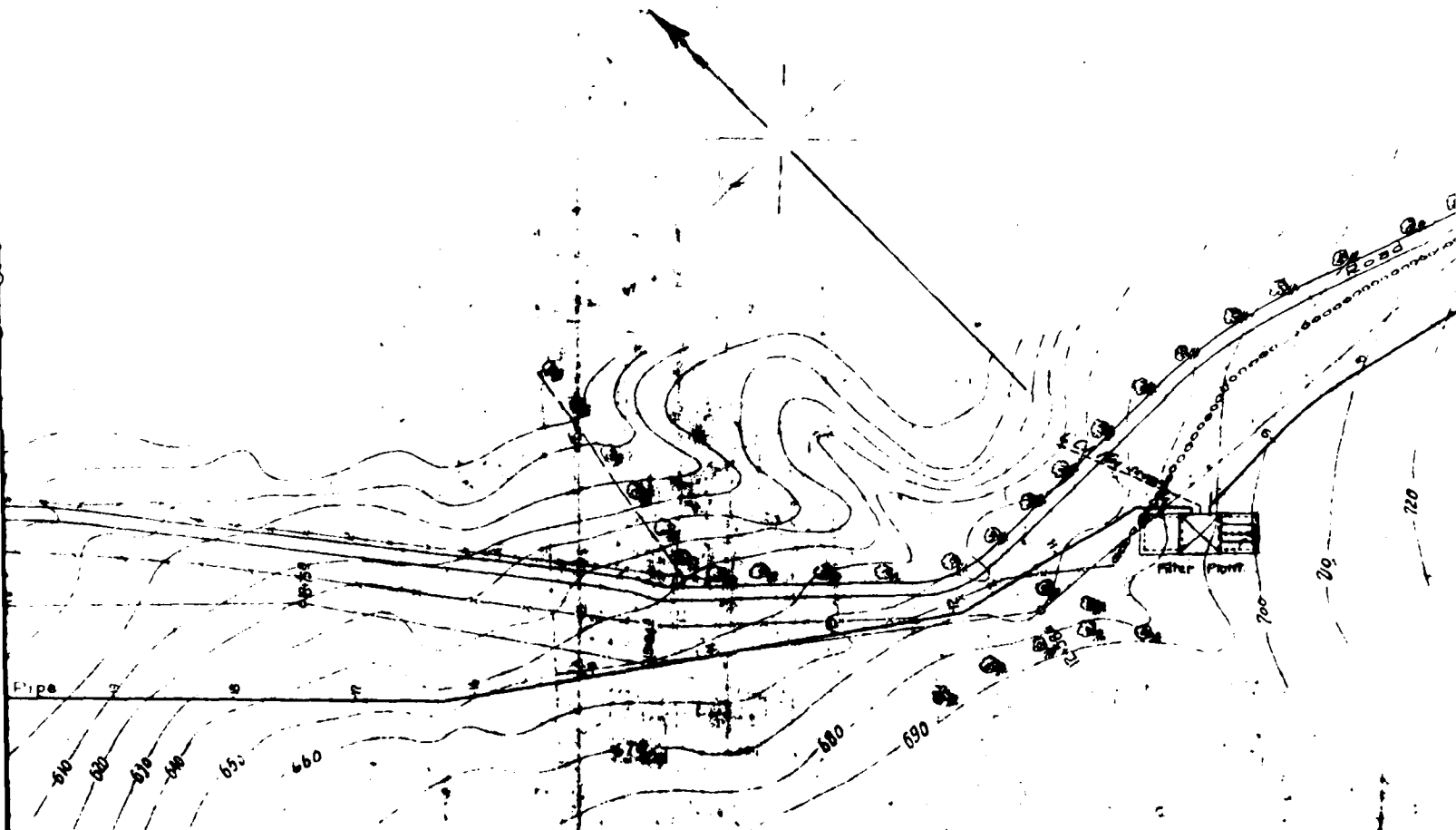
Made by: J. M. Benedict, Dec. 1917.
 Checked by: J. M. Benedict, Dec. 1917.
 By: George E. Bismarck, Sept. 1918.
 Checked by: J. M. Benedict, Sept. 10-1918. (Arizona)

Note-12' specials shall be Class D

Datum: EL 600

PROFILE ON CENTER LINE OF PIPE

SCALE: HORIZ. 1" = 100 FT.
VERT. 1" = 20 FT.



PLAN

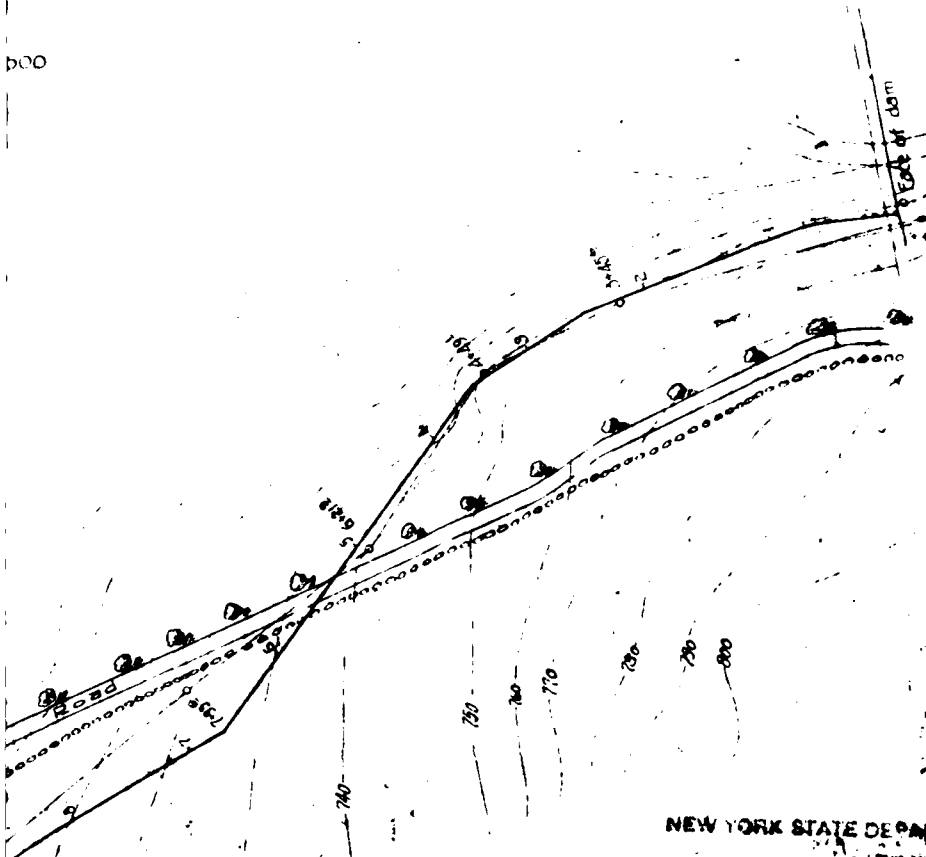
SCALE 1" = 100 FT.

NO. 1000 STATE DEPARTMENT OF HEALTH

APR 11, 1941

RECEIVED WATER SUPPLY DIVISION

WASHINGTON, D.C.



NEW YORK STATE DEPARTMENT OF HEALTH
amended: *Water Supply System for
Wingdale Prison, Wingdale, N.Y.*

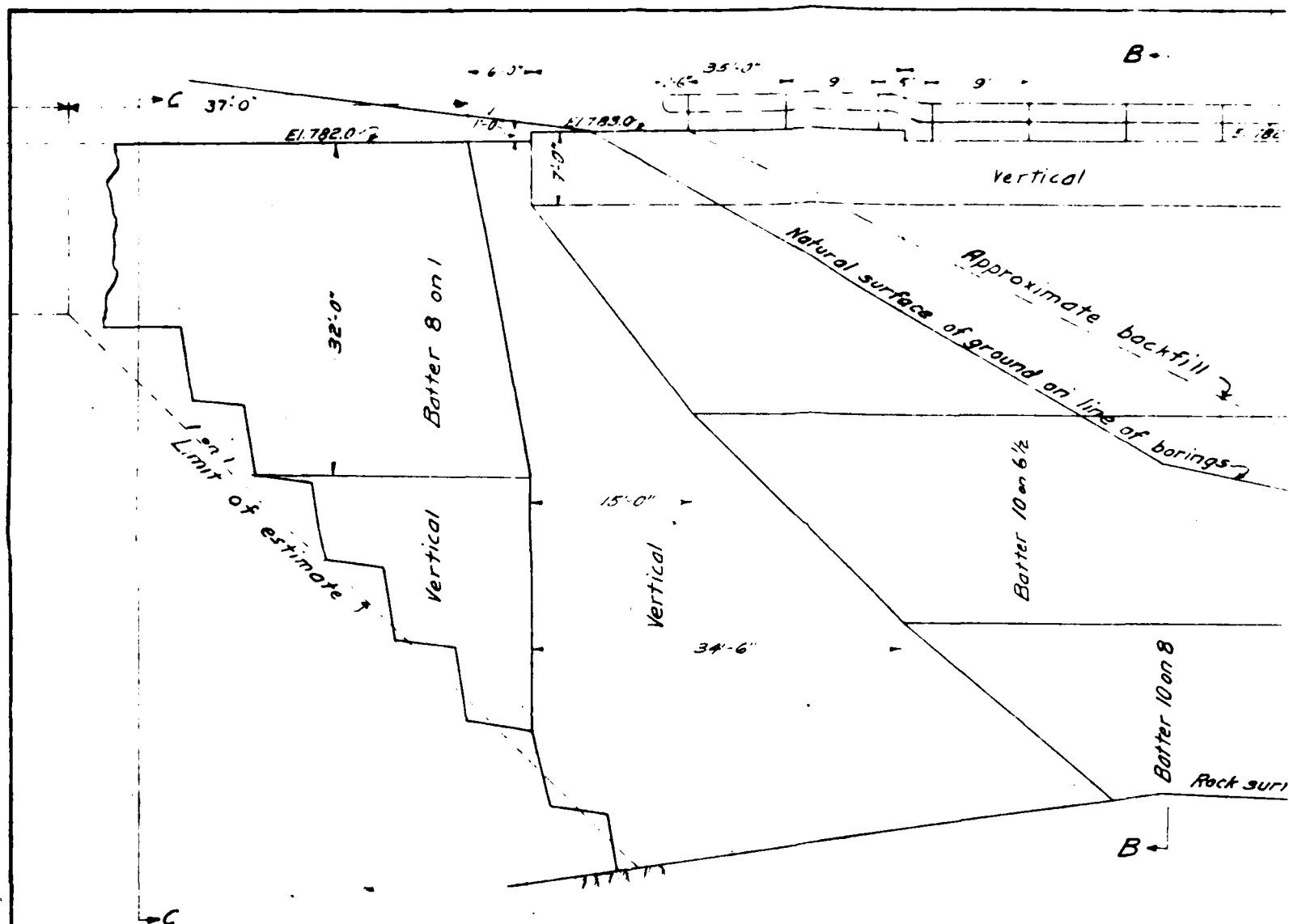
Mr. Nicollet
March 4, 1918

STATE OF NEW YORK
Dam and Water Supply
WINGDALE PRISON

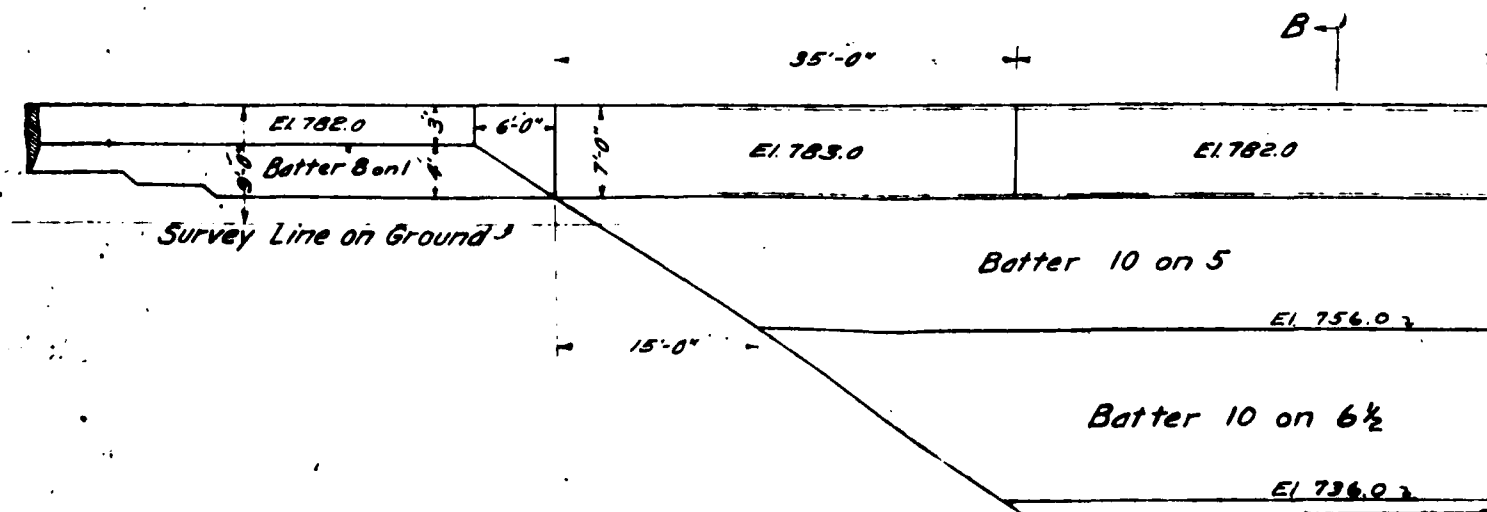
PLAN & ELEVATION

NY 07 OF 12 AL 11
March 4, 1918
Ten 30 Wingdale

March 4, 1918
See Nicollet

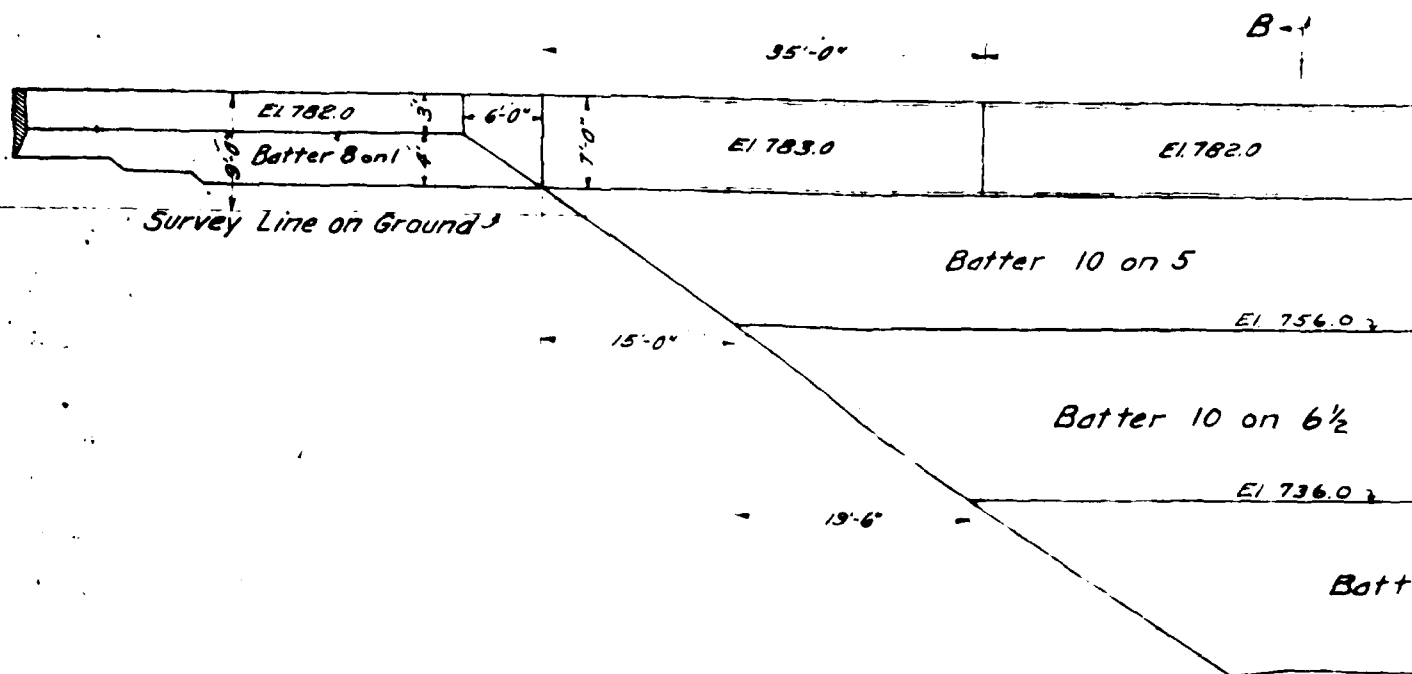


NOTE - Steps as shown are approximate only.
Location and nature of steps to be as directed
by the Engineer.



B-

NOTE: Steps as shown are approximate only.
Location and nature of steps to be as directed
by the Engineer.



For cross sections see sheet No. 6

Vertical expansion joints normal to face of
dam shall be constructed not over 34 feet apart.

All concrete to be 2nd class except roof of valve house.

A staff gage shall be constructed in the
concrete of the gate house substructure from
elev. 740 to elev. 780 graduated to tenths of
feet and marked at each foot with the elevation.
Details of the gage and location will be supplied
by the engineer. Cost of gage shall be included
in the contract price of 2nd Class Concrete.

Made by

Directed by S. T. ADAMS

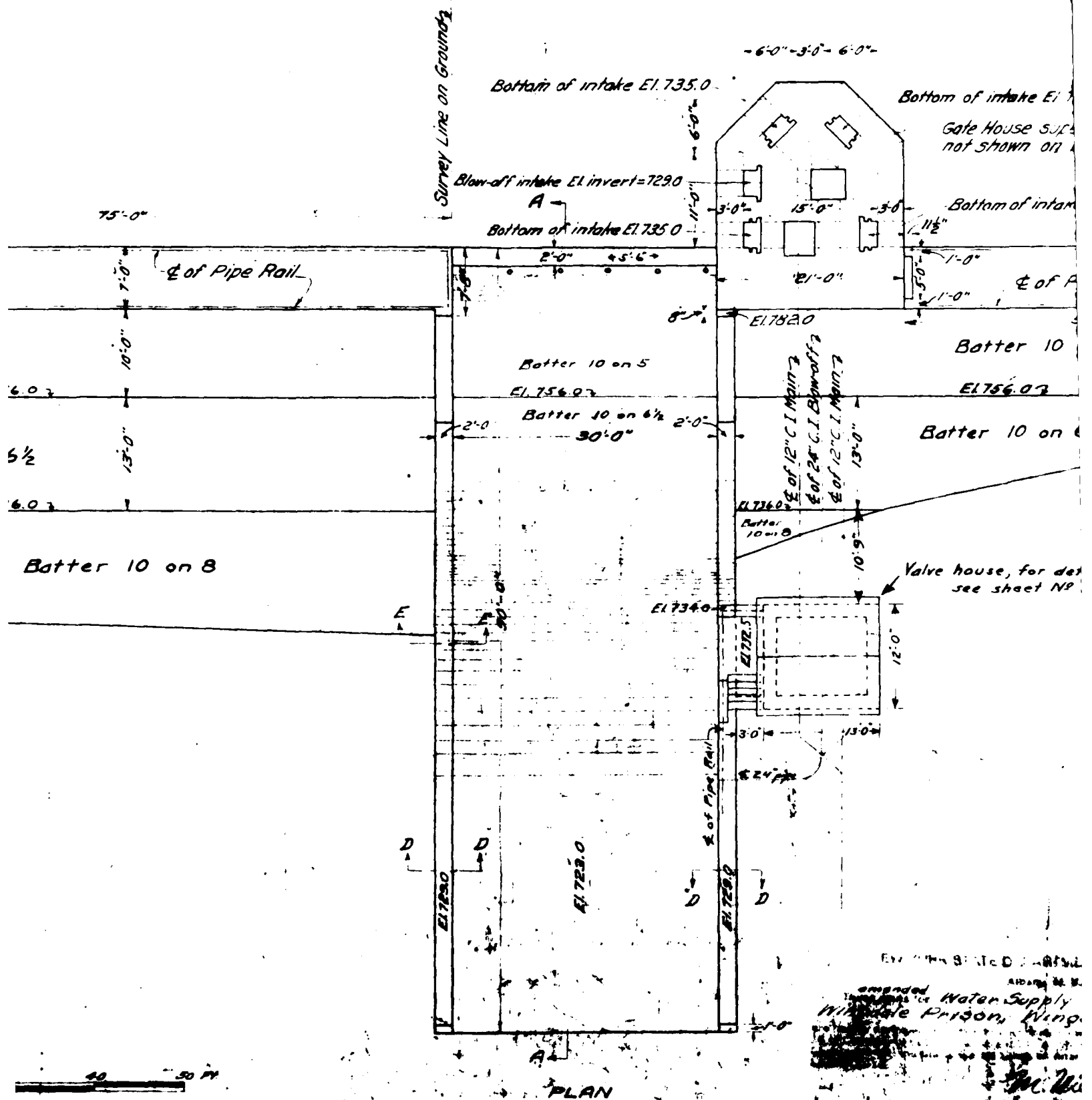
of Black H. L. Brainerd, June 21 19

Checked by

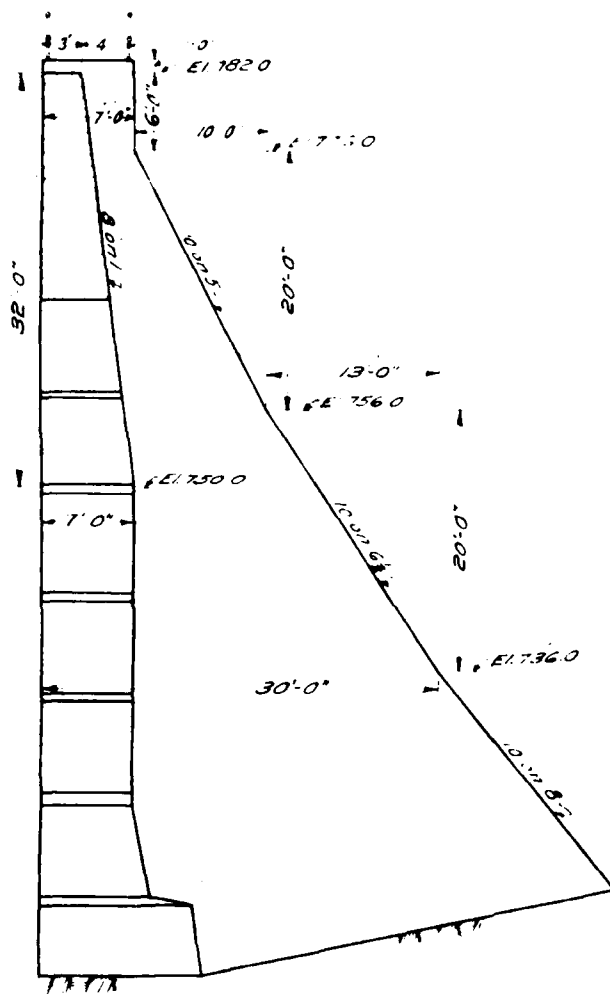


Scale in Feet

A-



Dr. J. W. Allen

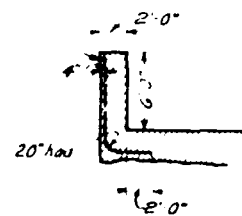


SECTIONAL ELEVATION C-C
Scale 1"=10'

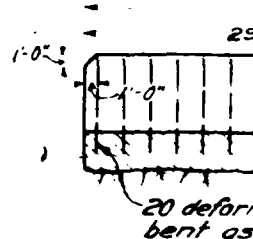


SECTIONAL ELEVATION
Scale 1"=10'

Deformed bars 2" C to C
bent as shown

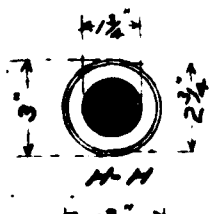


SECTION D-D



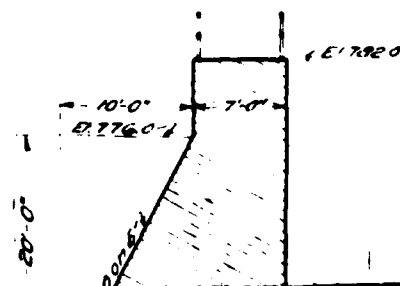
Note: - All reinforcement of
bars 0.56" net section

For Plan and Elevation see sheet No 5.
All concrete shall be 2nd class.
For location of sections see sheet No 5

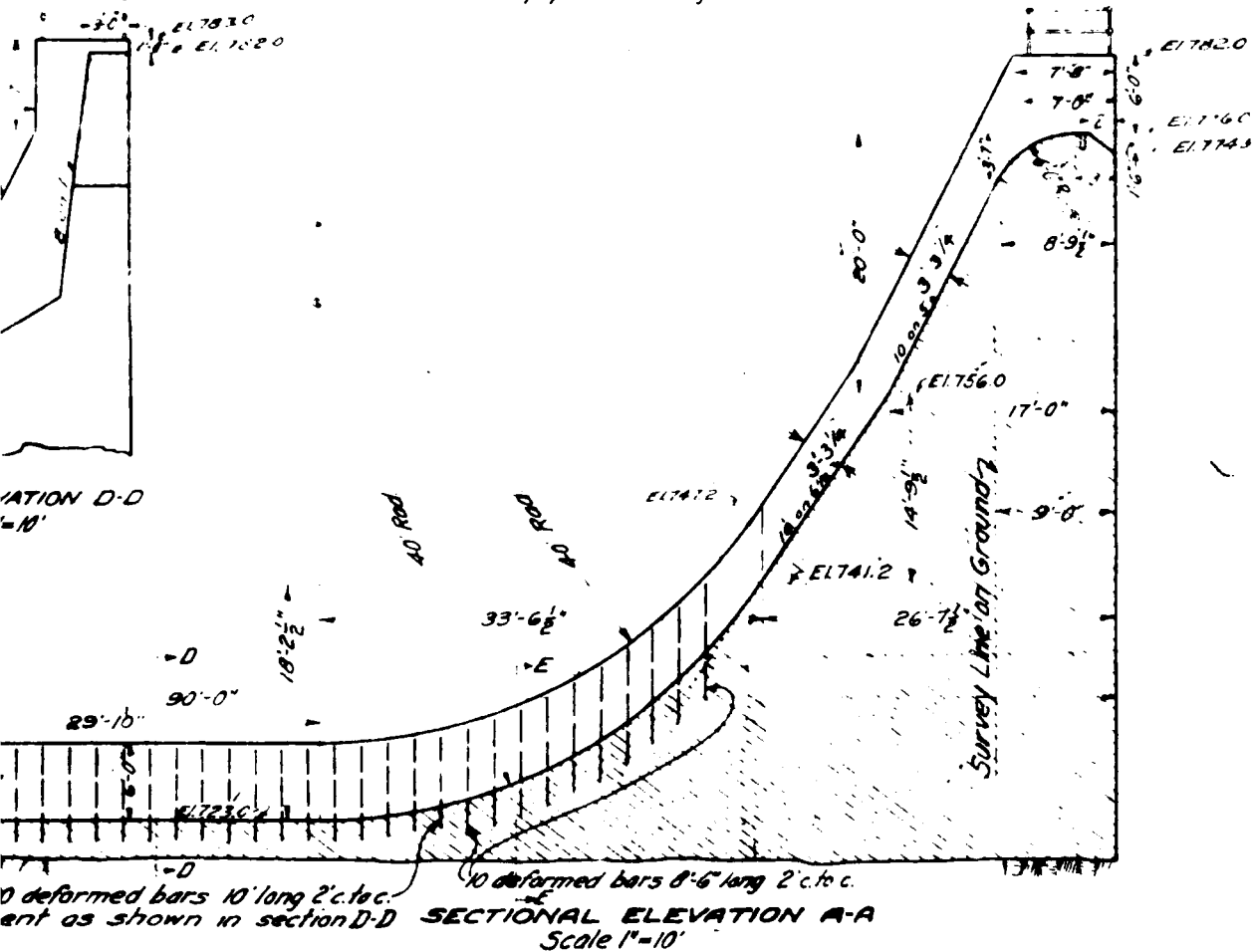


5'-6" c-c

6" 2'-0"

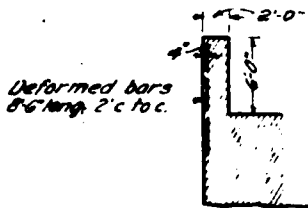


For detail of pipe railing see sheet N° 10



Note:- The apron as shown is typical only, its elevation, and floor thickness shall be as directed by the engineer. The apron shall be lengthened if so directed.

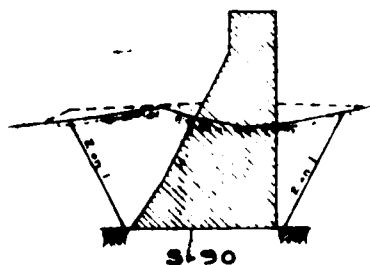
ment deformed
t section



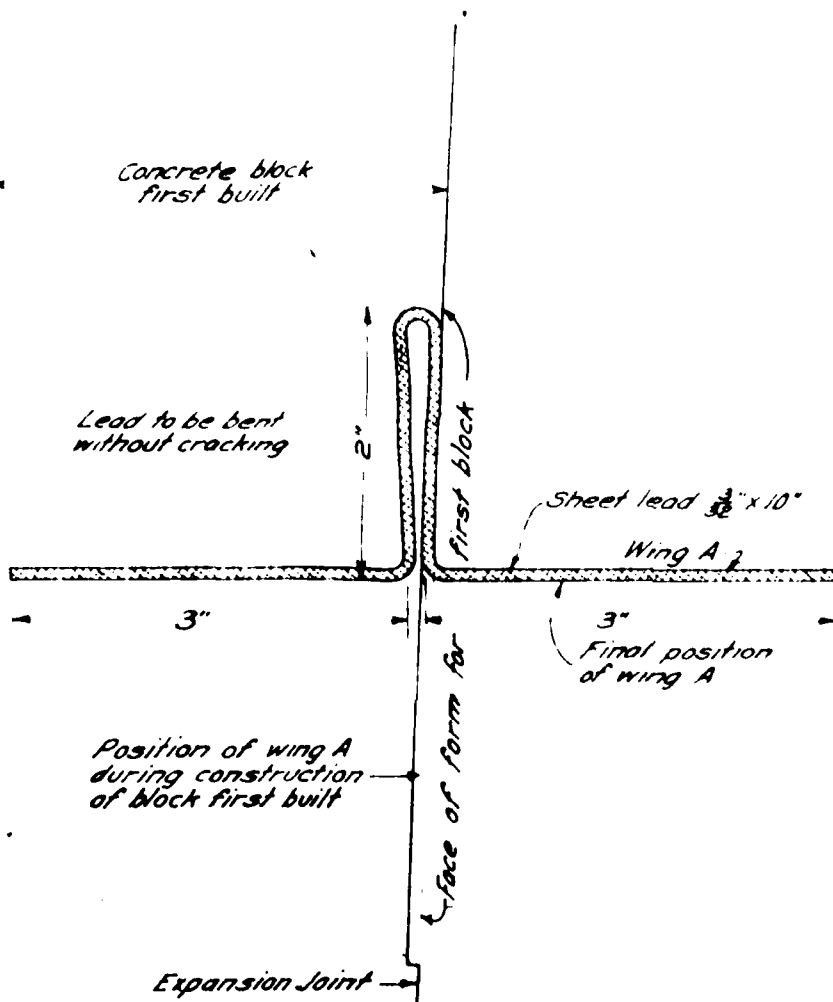
SECTION E-E



S-188



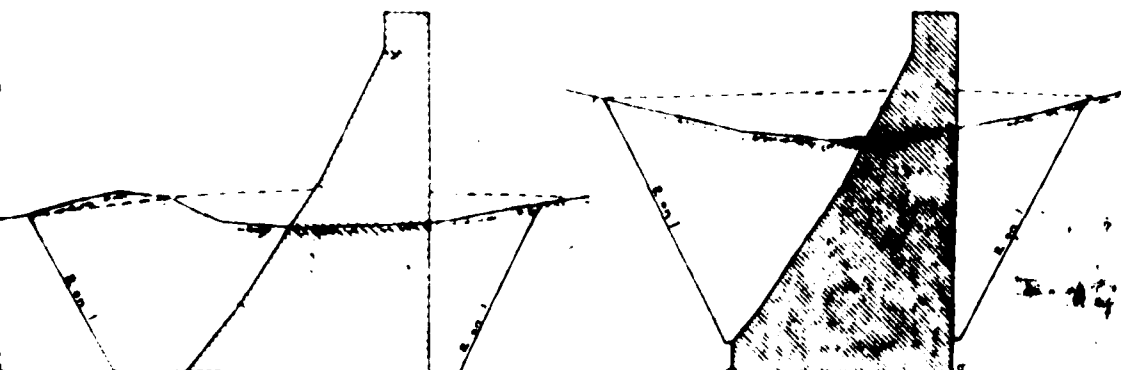
S-190

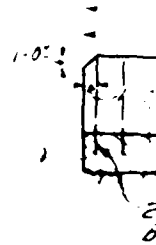


Payment for lead shall be included in contract price for 2nd class concrete.

DETAIL OF LEAD WATER STOP Scale - Full Size

To be used in all concrete expansion joints where a head of water is to be retained





SECTION D-D

Note:- All reinforcement bars 256" dia

Technical drawing of a dam structure, showing a cross-section and a top view.

Top View (Left):

- Overall width: 3"
- Overall height: 2 3/4"
- Inner circular feature with diameter: 1 1/4"
- Label: "H-H"

Side View (Left):

- Overall height: 11"
- Top flange width: 3"
- Top flange thickness: 1/4"
- Vertical section width: 1 1/2"
- Vertical section thickness: 1/2"
- Label: "Iron"

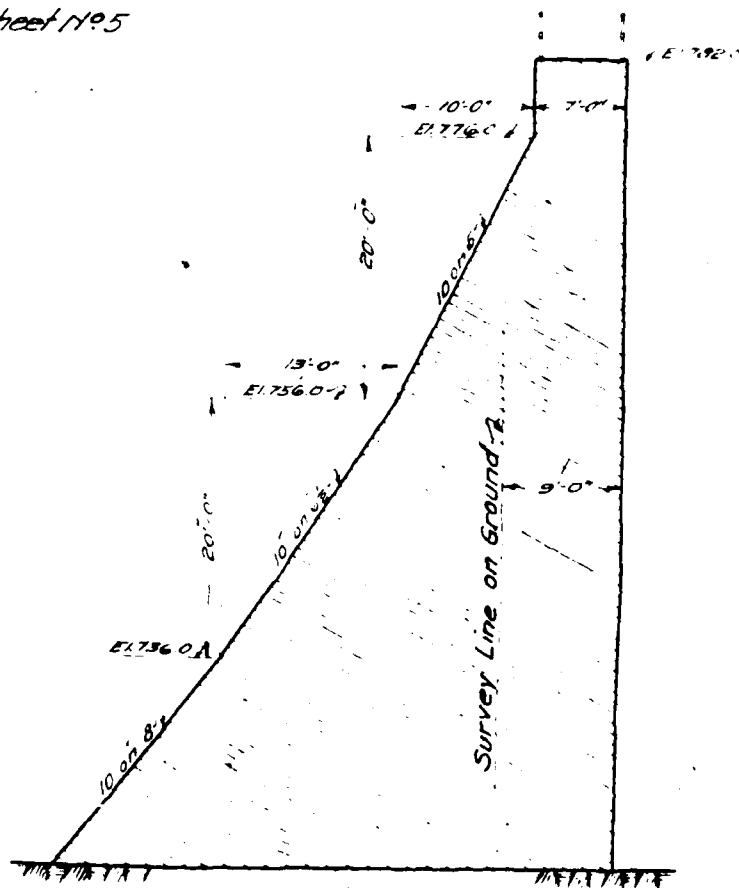
Side View (Right):

- Overall height: 12"
- Top flange width: 4"
- Top flange thickness: 1/4"
- Vertical section width: 5 1/2" c-c.
- Vertical section thickness: 1/2"
- Label: "2" pipe 12" lg"

Labels and Notes:

- "Paint black"
- "Face of dam"
- "Elev. 776.0"

6 sets required.



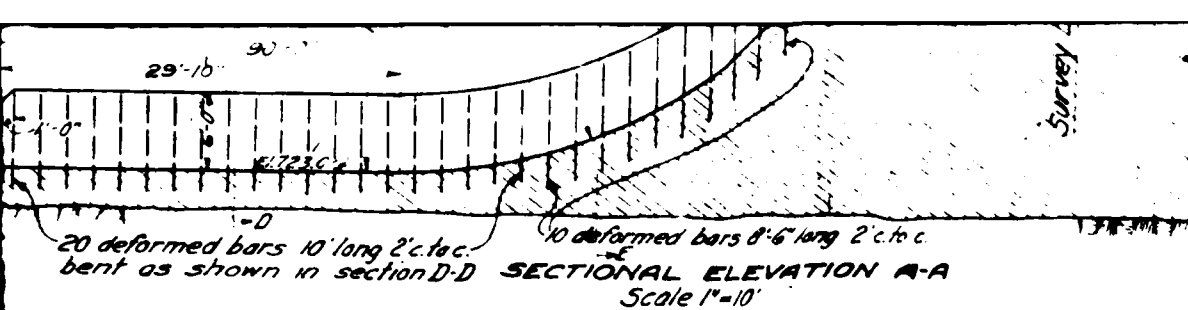
SECTIONAL ELEVATION B-B
Scale 1"=10'

Made By G. E. Gibson Dec. 1917.

Traced By C.J. Miskern

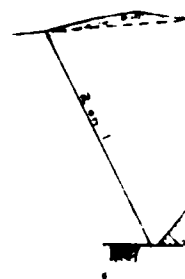
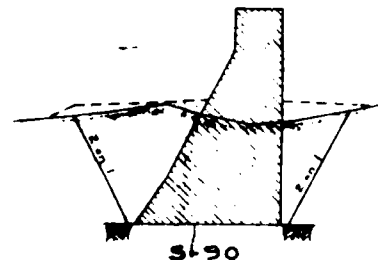
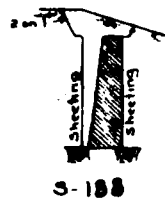
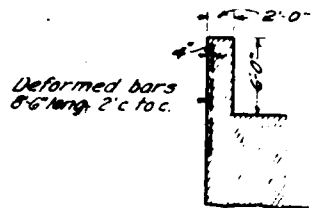
1st Check H. C. Brainerd June 21, 188.

2nd. Check.



Note:- The apron as shown is typical only, its elevation, and floor thickness shall be as directed by the engineer. The apron shall be lengthened if so directed.

Reinforcement deformed 6" net section



Note:- To secure a bond and prevent sliding of the dam the rock surface under the dam shall be roughened to an extent and in a manner satisfactory to the engineer.

The base of the structure shown on this sheet shall be considered as approximate only and in order to secure a proper foundation shall be of such dimensions and at such elevations as may be directed by the Engineer

Oct 19 1908
amended Water Supply System for
Wingdale Prison, Wingdale, N.Y.

ALTH
March 4, 1908
Water Supply System for Wingdale
Prison, Wingdale, N.Y.

M. McCall

M. McCall

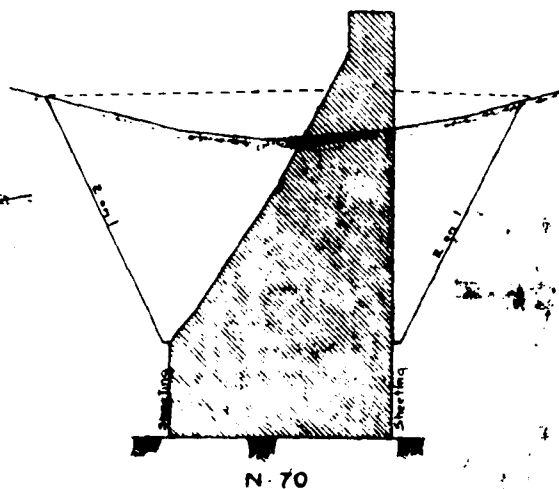
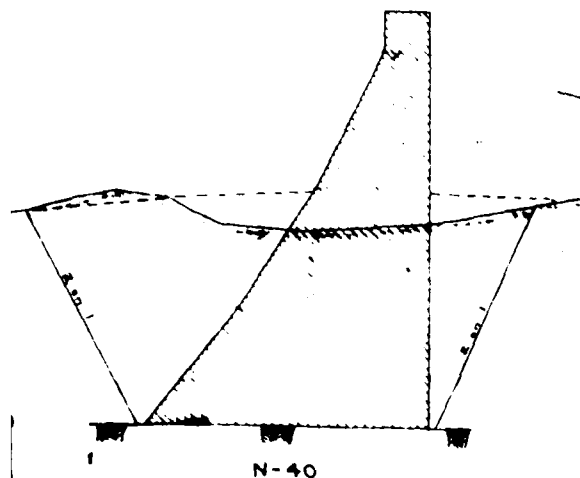
Expansion Joint

Payment for lead shall be included in contract price for 2nd class concrete.

DETAIL OF LEAD WATER STOP

Scale = Full Size

To be used in all concrete expansion joints where a head of water is to be retained



TYPICAL SECTIONS OF DAM SHOWING BASIS OF EXCAVATION ESTIMATE

Scale 1 in. = 20 feet

STATE OF NEW YORK

Water and Water Supply System for

Winthrop Prison

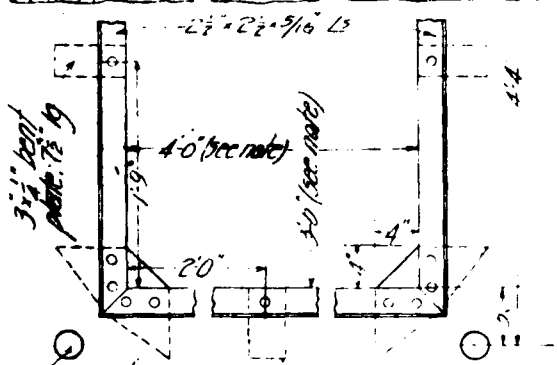
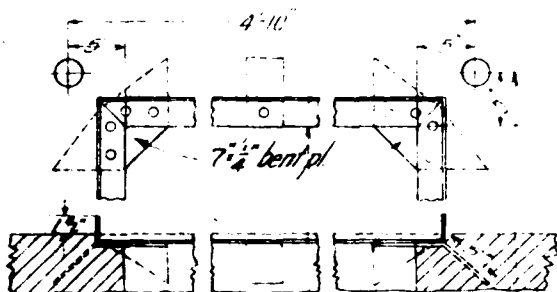
CROSS SECTIONS & DETAILS OF DAM

Scales as indicated

March 2

[Signature]

1918



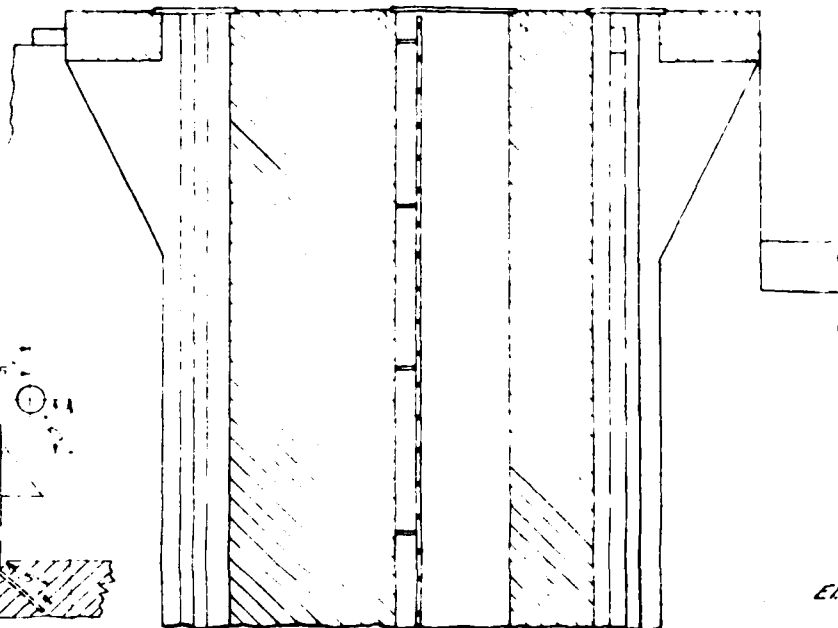
2 1/2" H.I. pipe, 8' long, top flush with floor. To be used as sockets for railing

DETAIL OF WELL CURB 2-SETS REQUIRED.

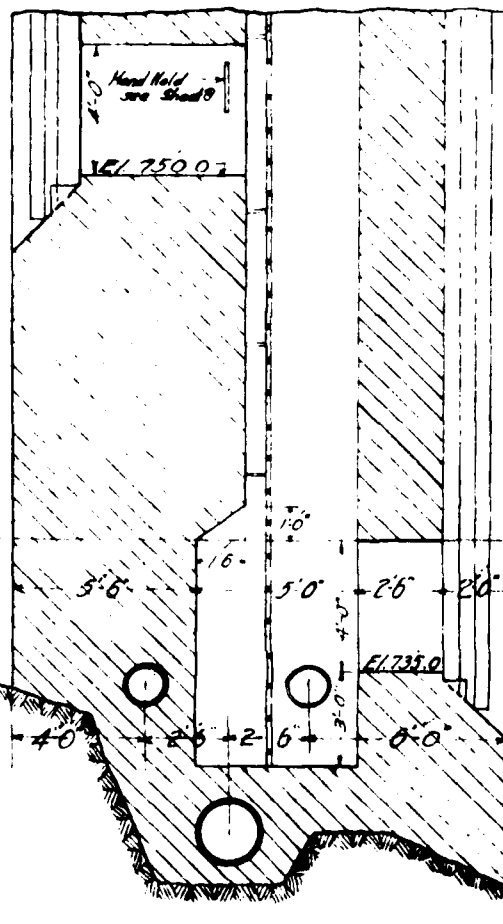
SCALE 1/2" = 1'-0"

NOTE: These dimensions to be maintained, if angles of a different size are used

For detail of Gate Recess Curb see sheet No. 8.

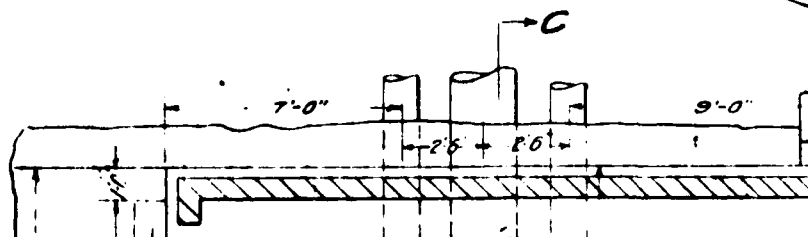
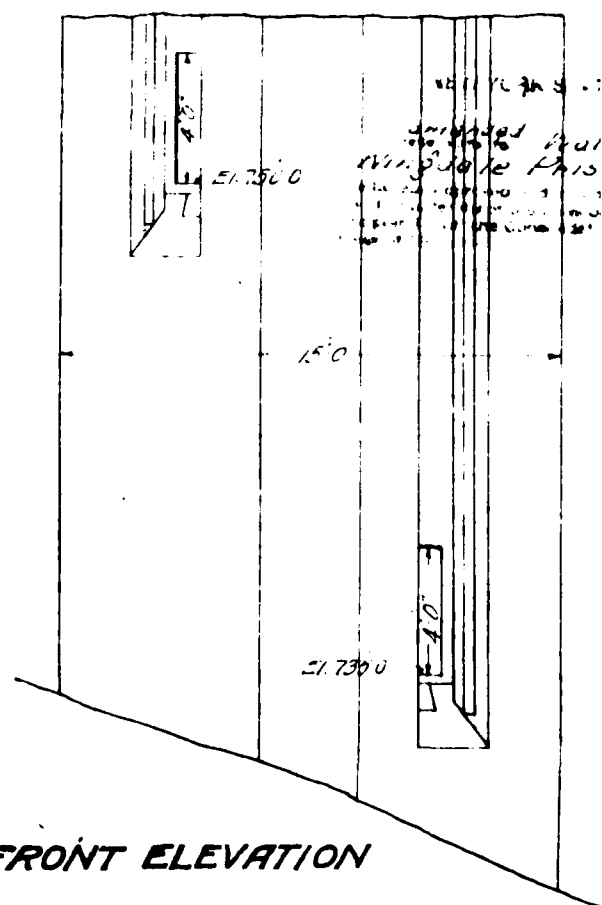
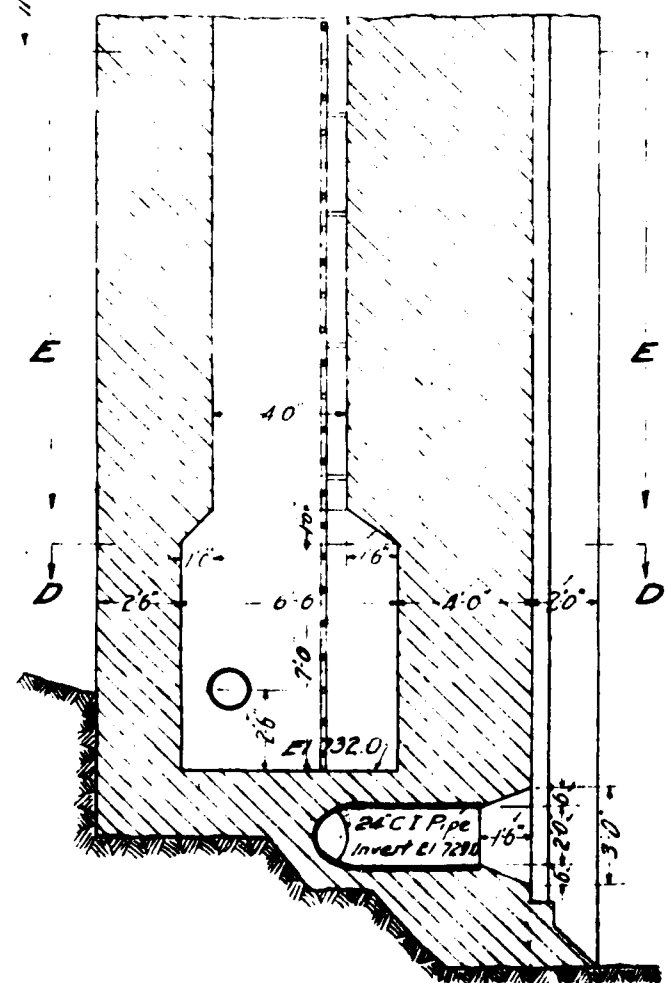
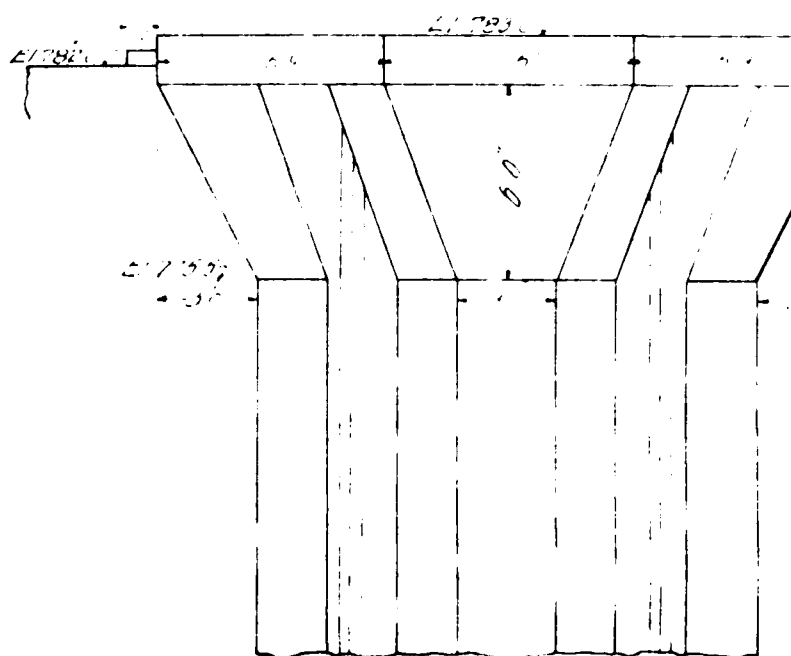
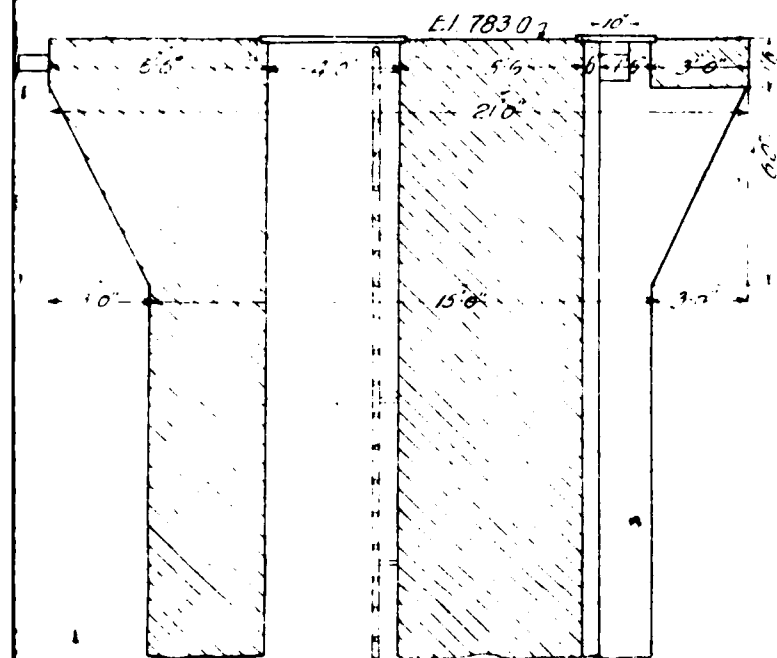


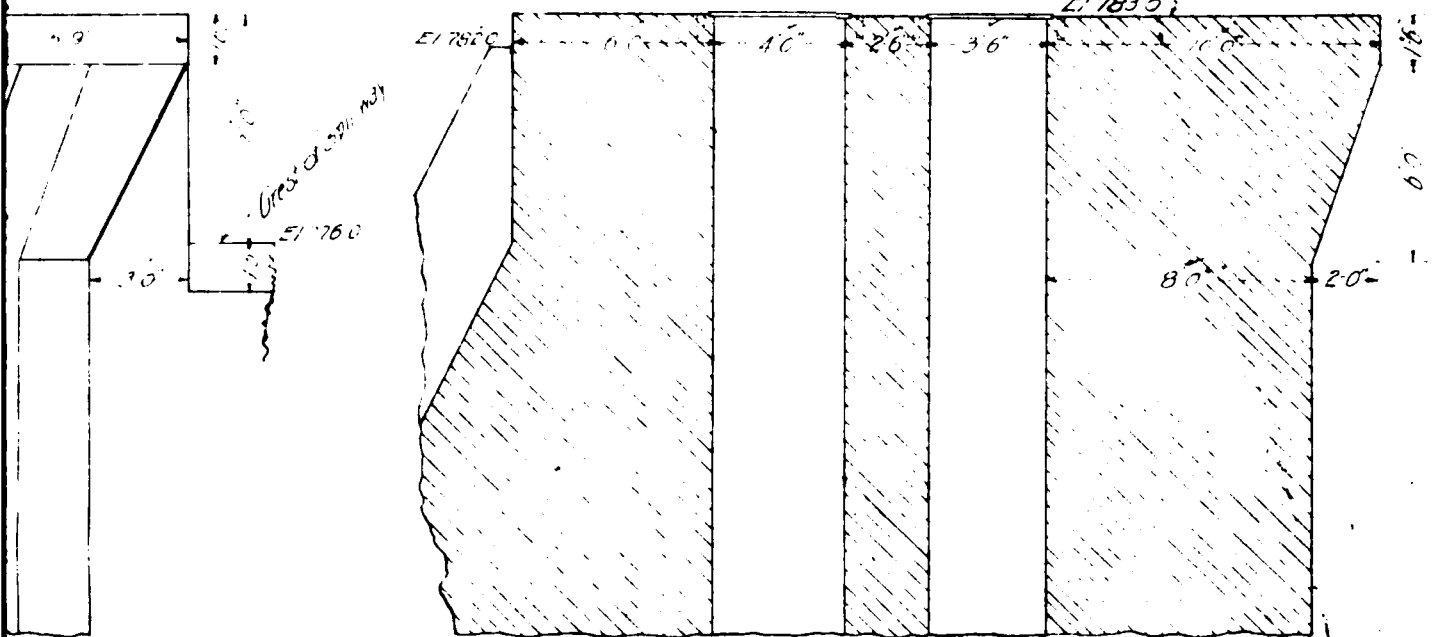
EL 763.07



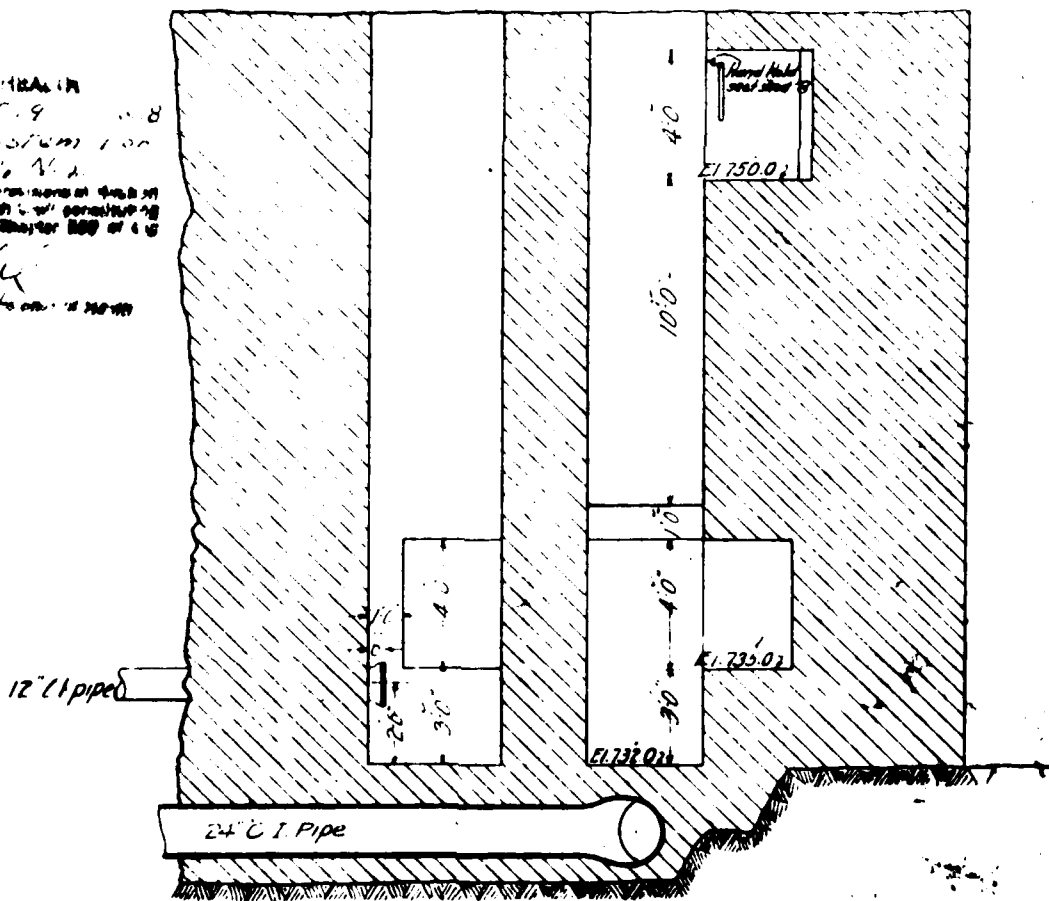
EL 754.07

SECTIONAL ELEVATION B-B





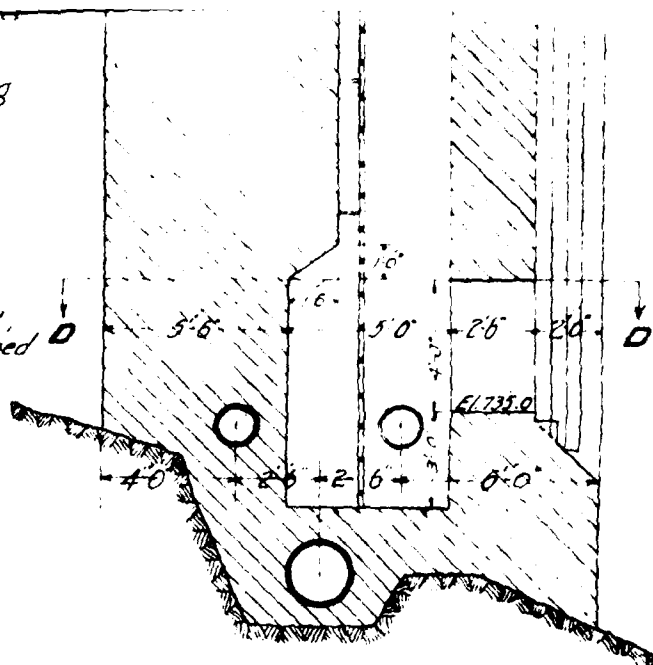
CONTRACT NO. TWENTY-THREE
 New York City, N.Y. Oct. 9, 1918
 and Water Supply System for
 the Prison, Sing Sing, N.Y.
 This contract was made in accordance with the provisions of the
 laws of the State of New York, Chapter 100, of 1918, and
 Chapter 100, of 1919, as amended by Chapter 100 of 1920
 M. Macale



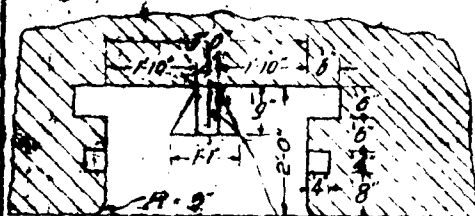
SECTIONAL ELEVATION C-C

For embedded metal see sheet No. 8.
 All concrete shown on this sheet shall be 2nd class.
 The base of the structure shown on this plan shall

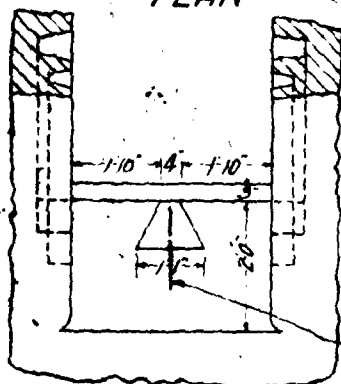
For detail of Gate Recess Curb
see sheet No. 8.



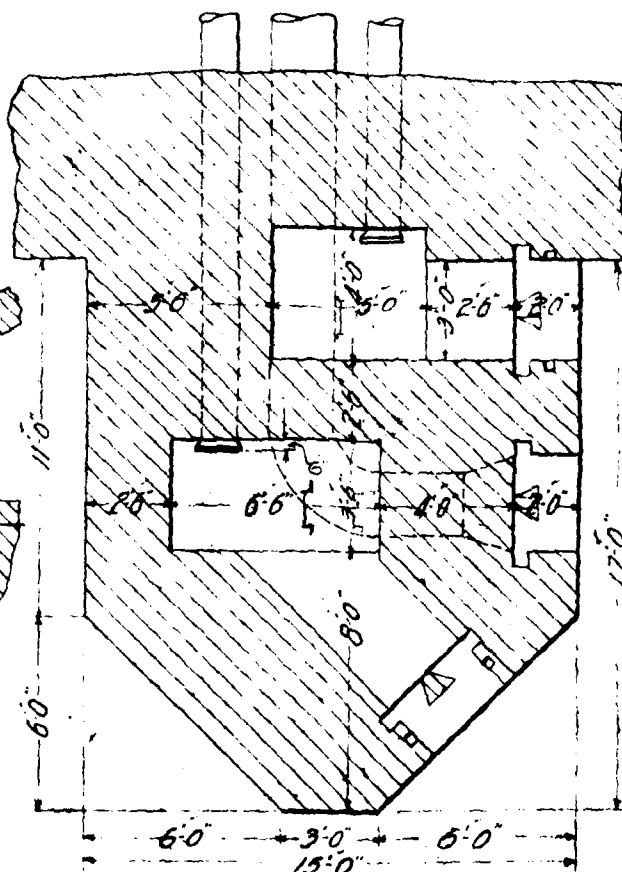
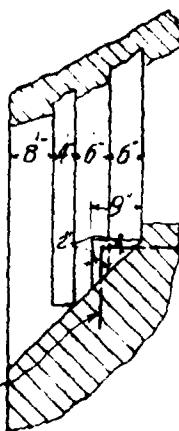
SECTIONAL ELEVATION B-B



PLAN



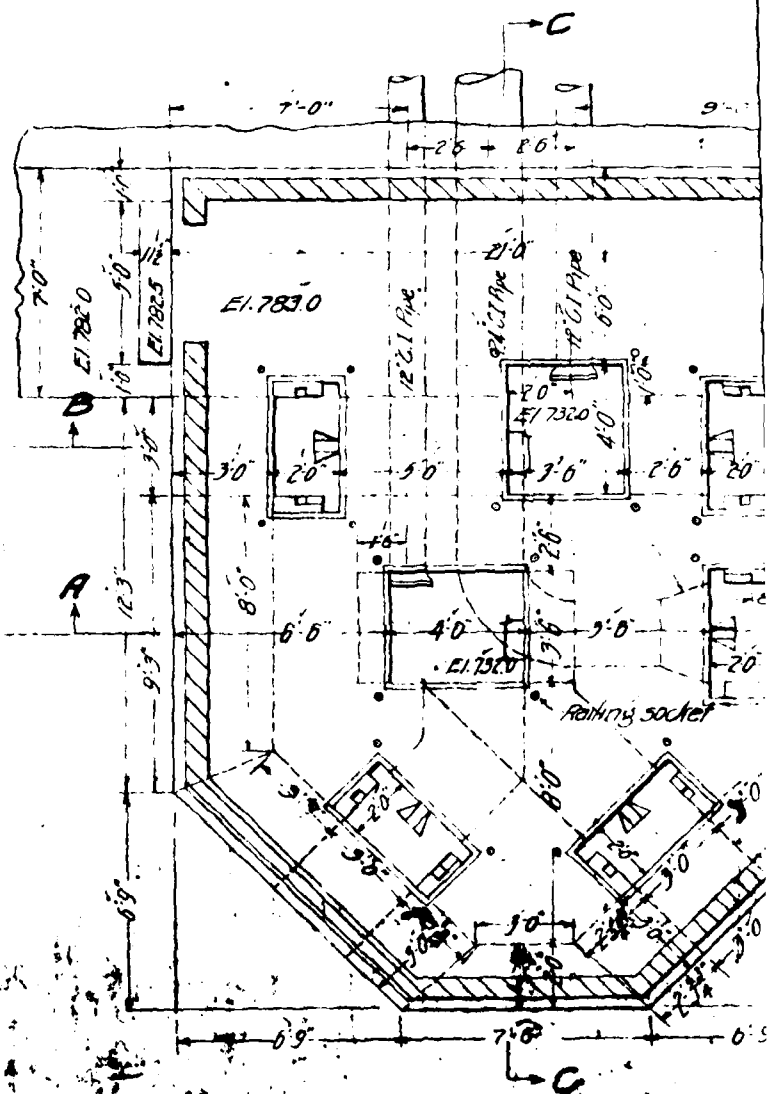
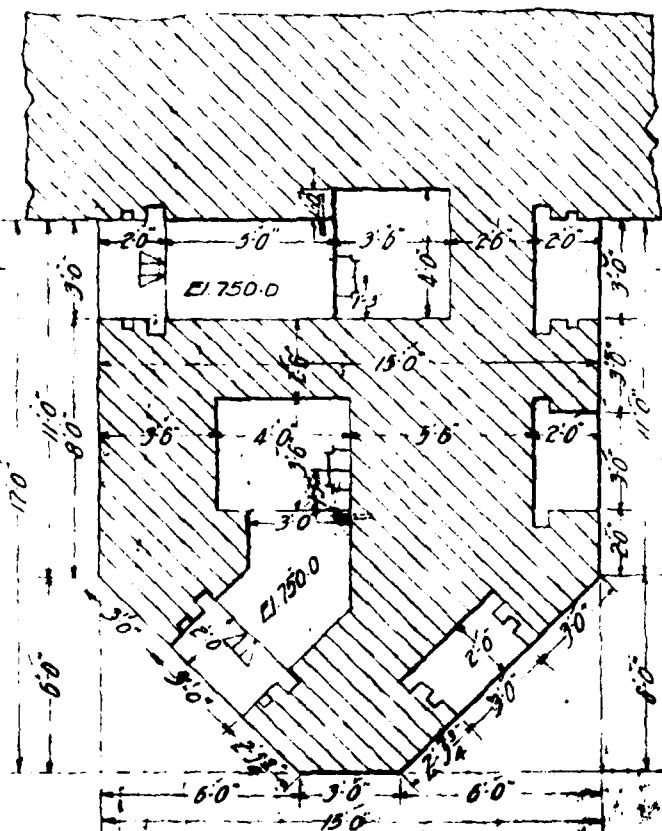
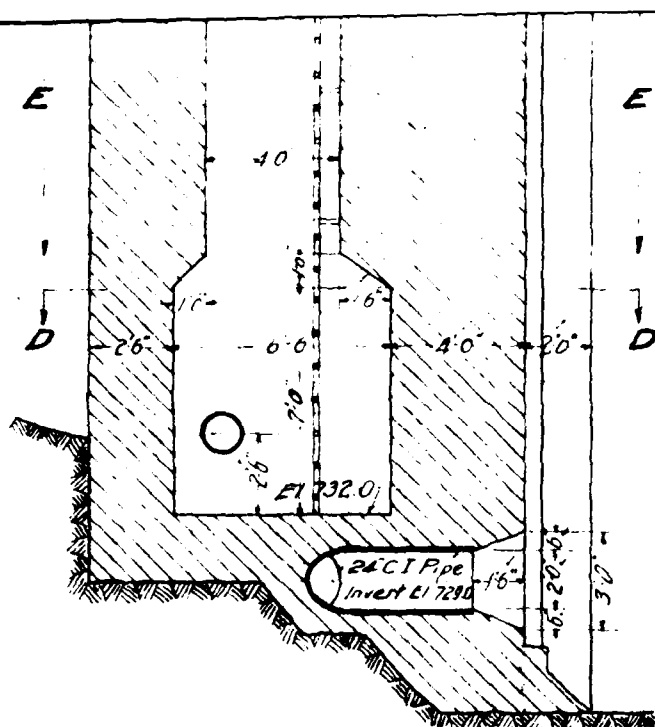
ELEVATION



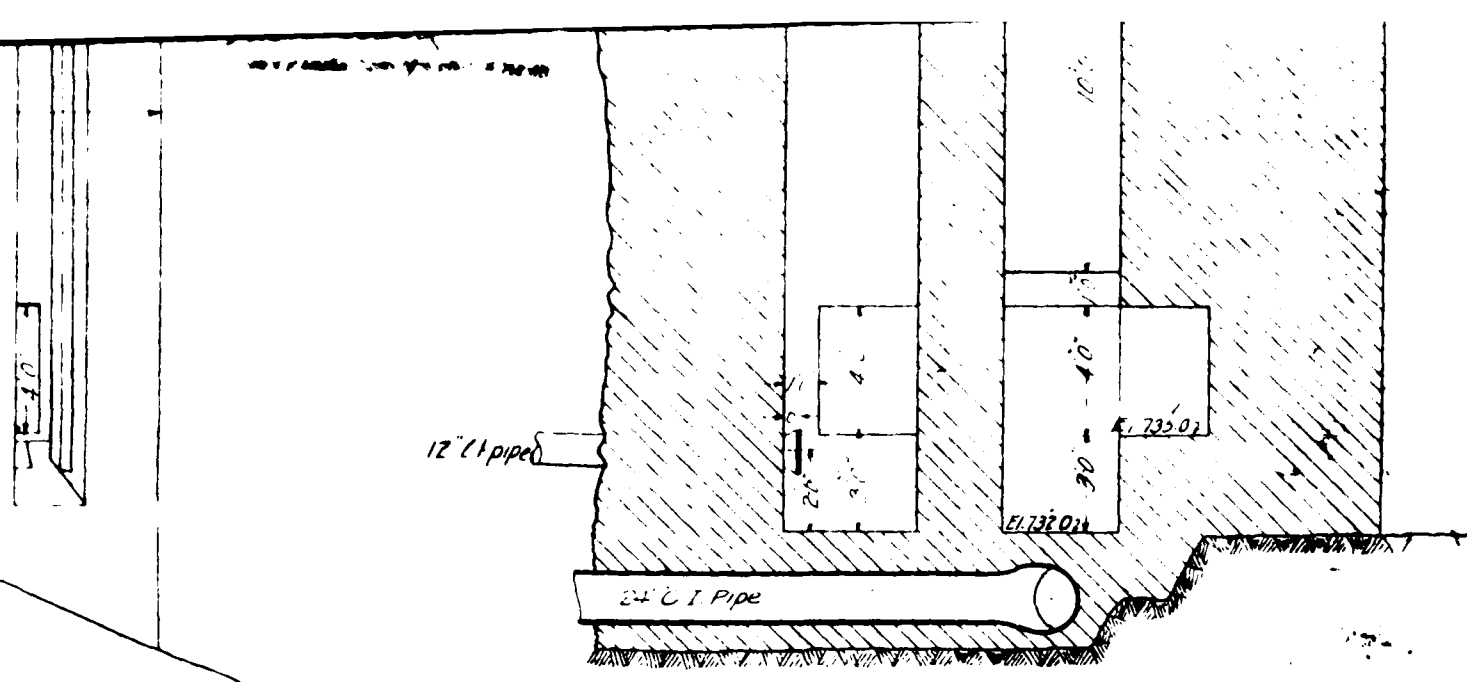
D-D

SECTIONAL PLAN BELOW EL. 739.0

MADE BY S. H. Gibson, Dec. 1917
FORCED BY M. J. Smith, Dec. 1917
FINISHED BY J. H. Brown, Jan. 21-1918
CHECKED BY S. H. Gibson, Dec. 18-1918 (Revisions)



details of gate house superstruc



SECTIONAL ELEVATION C-C

For embedded metal see sheet No 8.

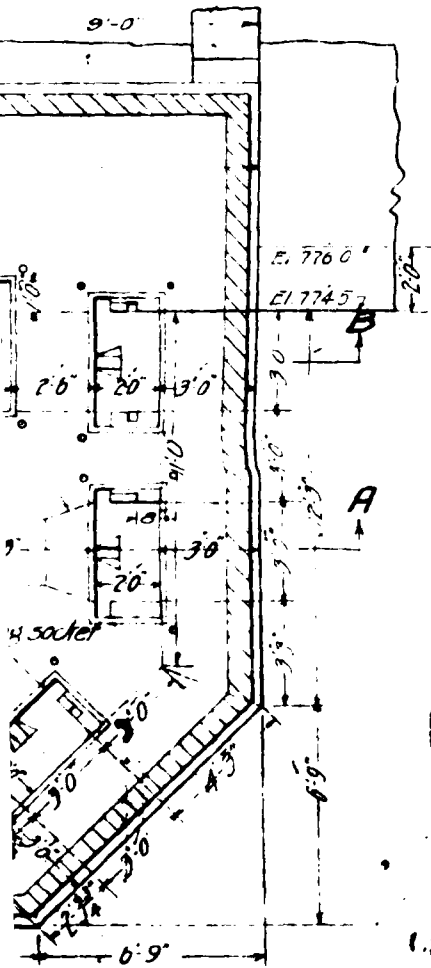
All concrete shown on this sheet shall be 2nd class.

The base of the structure shown on this plan shall be considered as approximate only and in order to secure a proper foundation shall be of such dimensions and at such elevations as may be directed by the engineer.

NEW YORK, N.Y. March 4, 1908

Water Supply System for Wingdale Prison, Wingdale, N.Y.

M. McCall
Deputy Engineer



STATE OF NEW YORK

Drain and Water Supply System for

Wingdale Prison

GATE HOUSE STRUCTURE

Sheet No. 9

March 2, 1908

M. McCall

W. B. Ladd

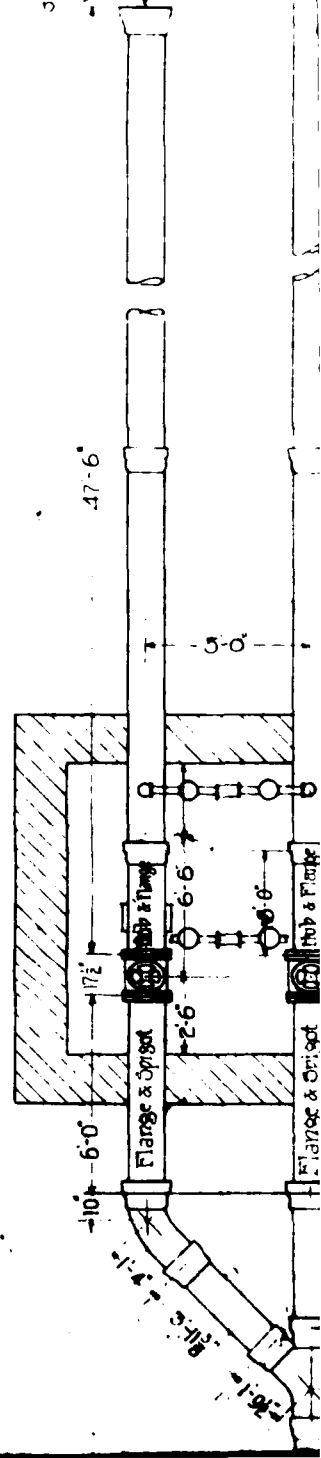
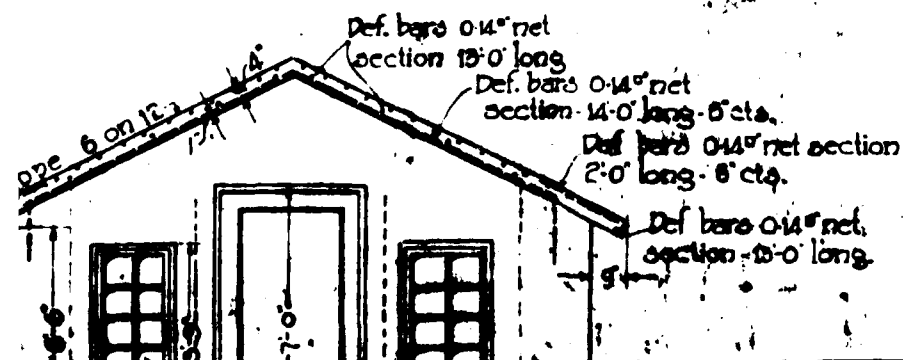
3.0

superstructure see sheet No 9.

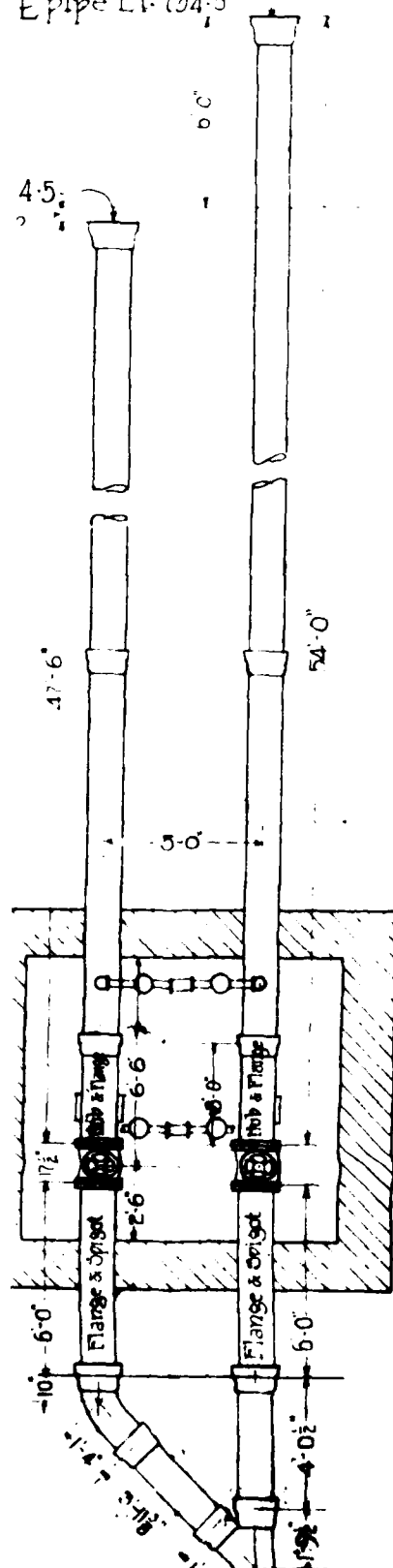
Φ pipe El. 134.5

Φ pipe El. 134.5

base of the structure shown on this sheet shall be considered approximate only and in order to secure a proper foundation shall be of such dimensions and at such elevations as shall be directed by the Engineer.
 heavy wood door required for masonry opening of 3'-7".
 fixed windows required for masonry opening of 1'-9" x 3'-9".
 waterproofing compound satisfactory to the Engineer
 cement mixed with concrete used in roof.
 floor of operating platform shall be so constructed as to be capable in order to give access to pipes and valves.
 cast iron pipe shown on this sheet shall be Class "A", 24" specials 5' and 12' specials Class "D".



E pipe El. 734.5

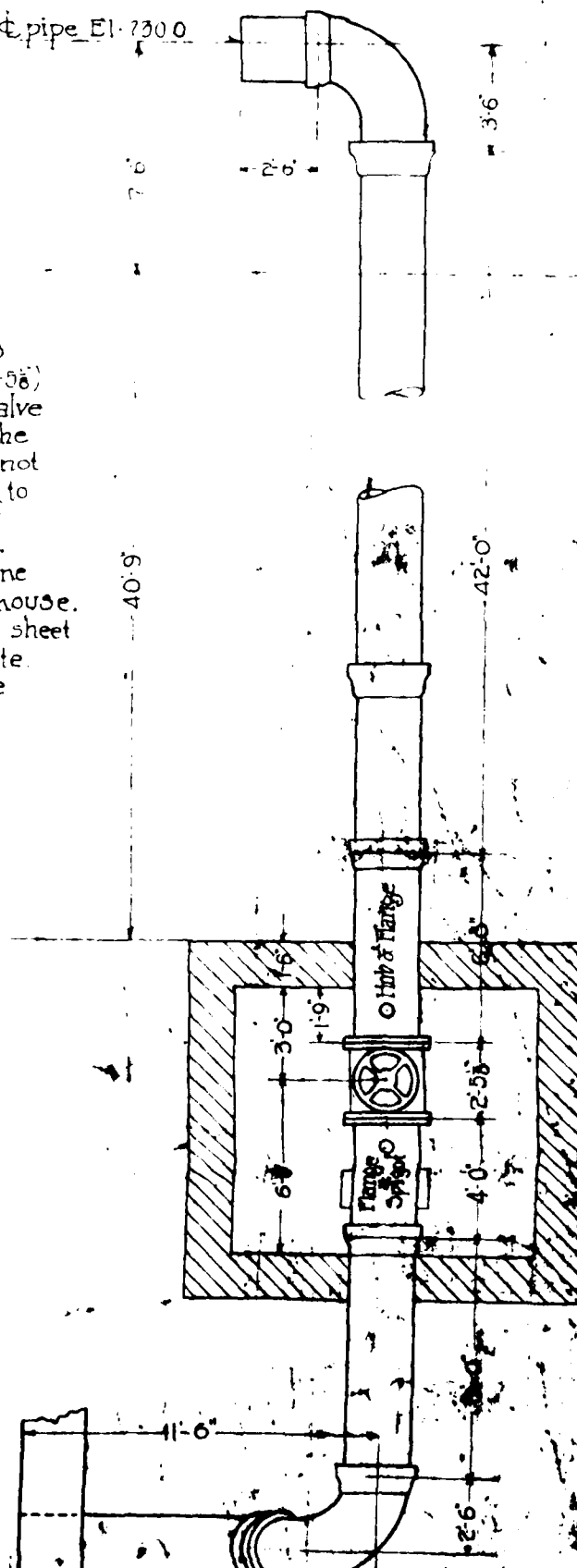


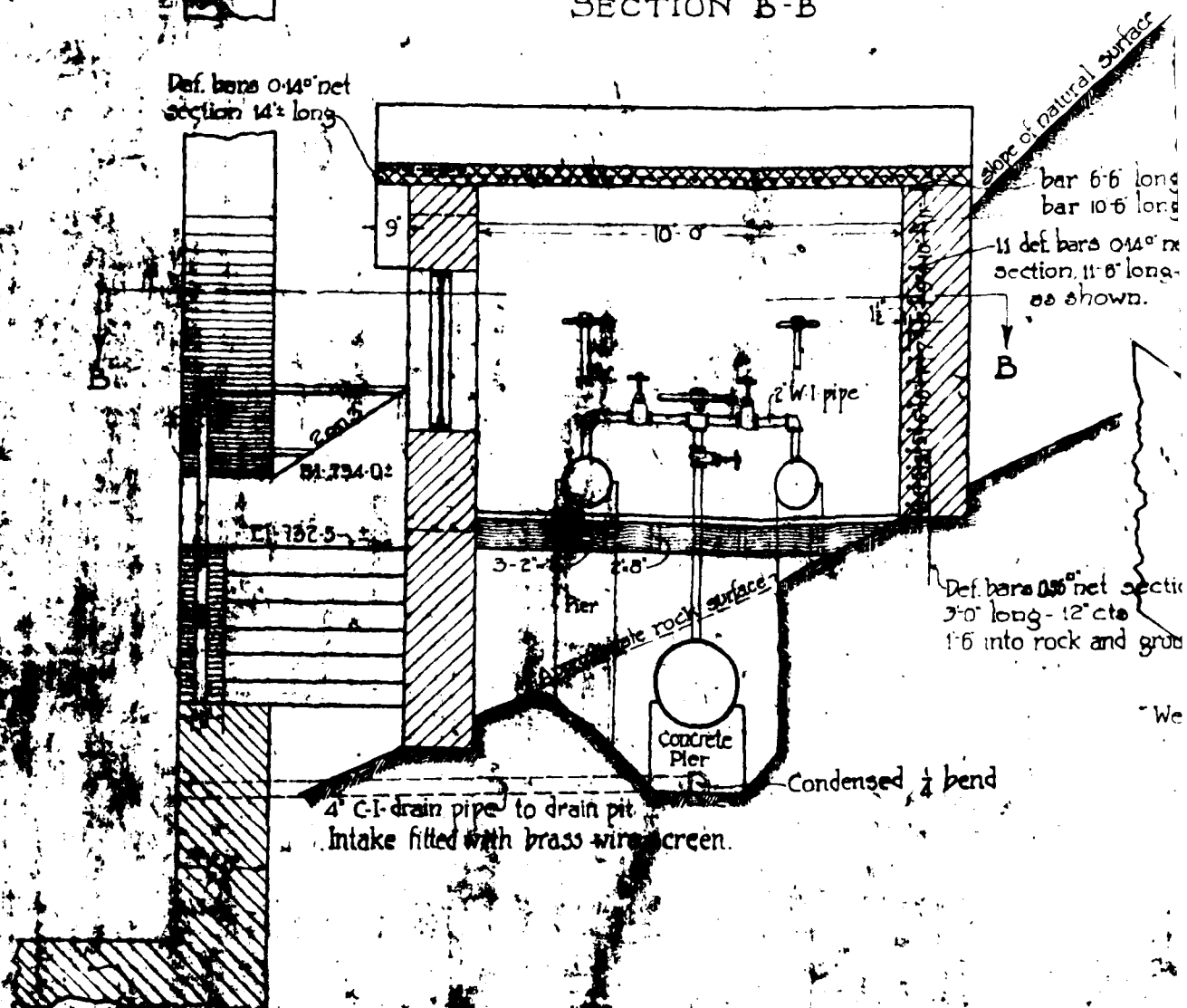
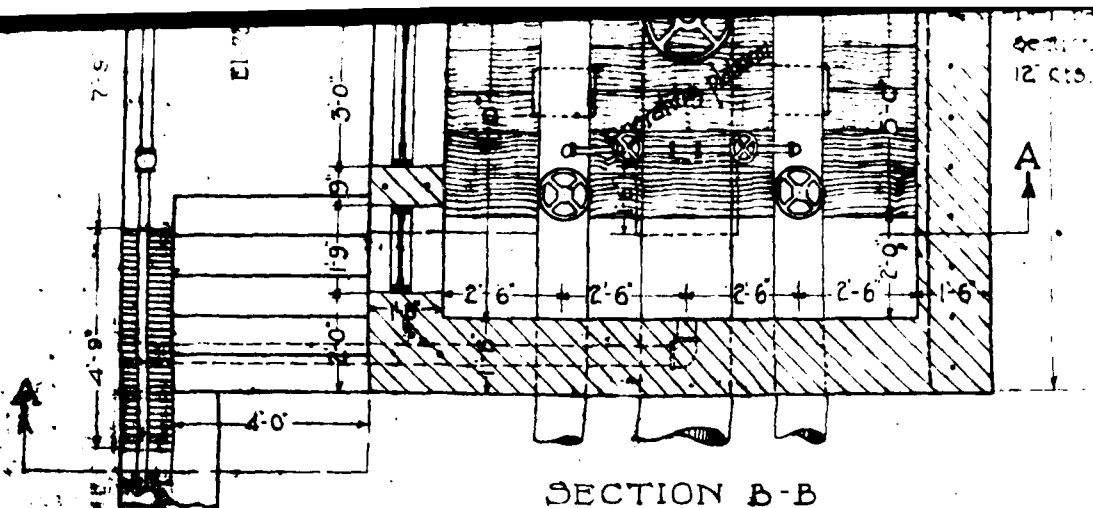
Face of dam →

NOTE - Dimensions of valves between flange faces (17 1/2 and 2' 5 1/8") were taken from a standard valve catalog. If the dimensions of the valves used on the work are not the same, it will be necessary to modify the relation of center of valves to walls of valve house.

Lay pipes to a grade of one per cent from dam to valve house. All masonry shown on this sheet shall be second class concrete, excepting roof, which shall be reinforced concrete.

E pipe El. 730.0





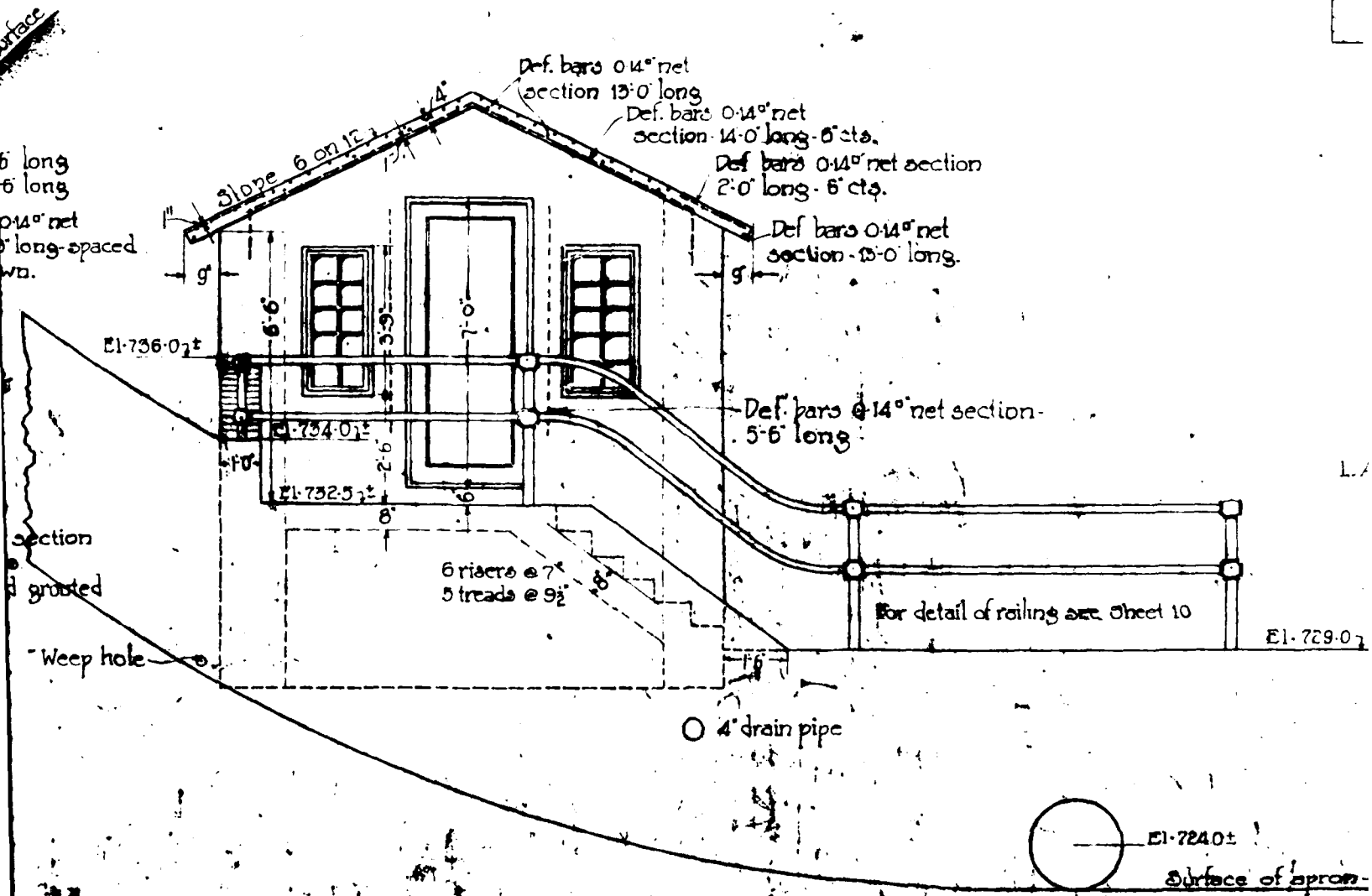
DETAILS OF VA

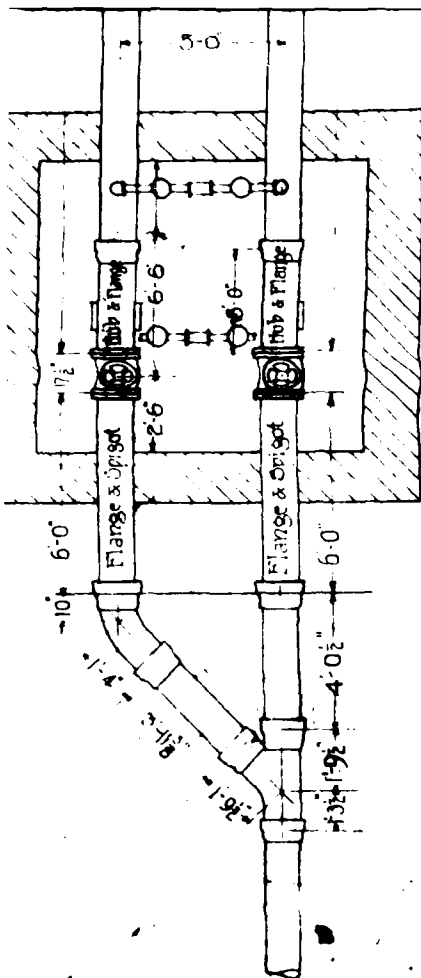
SCALE - 5/1

Waterproofing compound satisfactory to the Engineer shall be mixed with concrete used in roof.

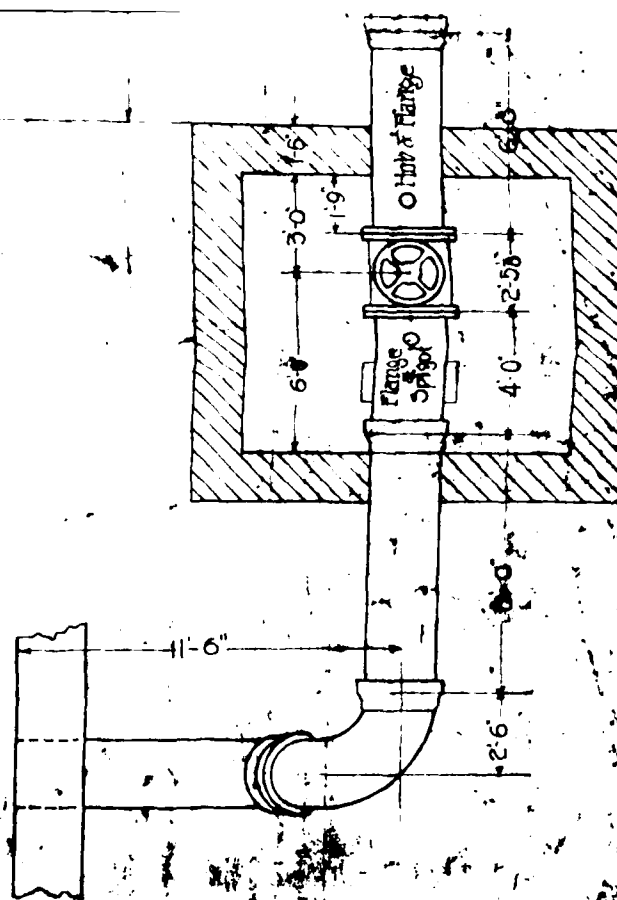
Floor of operating platform shall be so constructed as to be removable in order to give access to pipes and valves.

All cast iron pipe shown on this sheet shall be Class 'A', 24" specials Class 'B' and 12" specials Class 'D'.





LAYOUT OF 12" PIPE

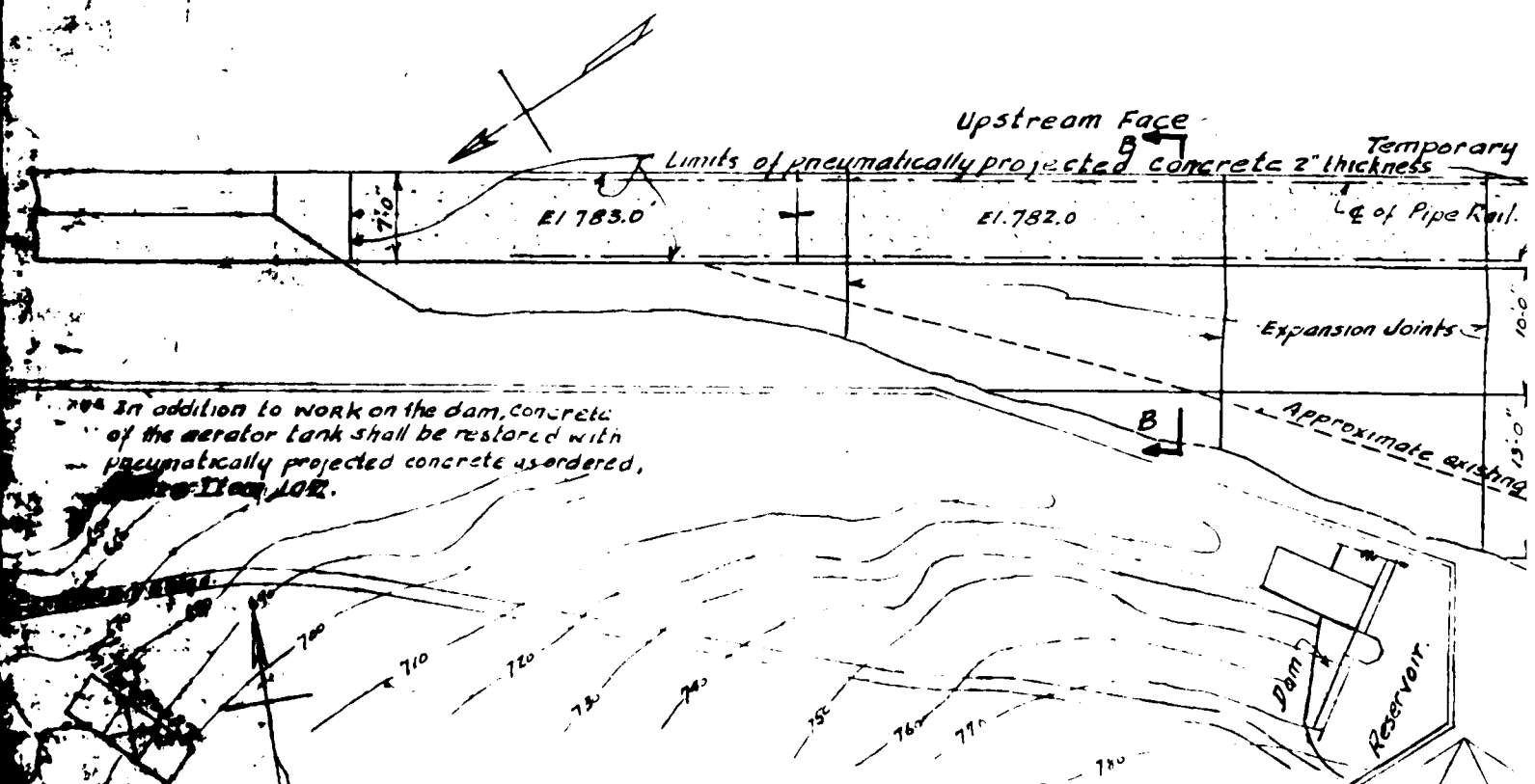
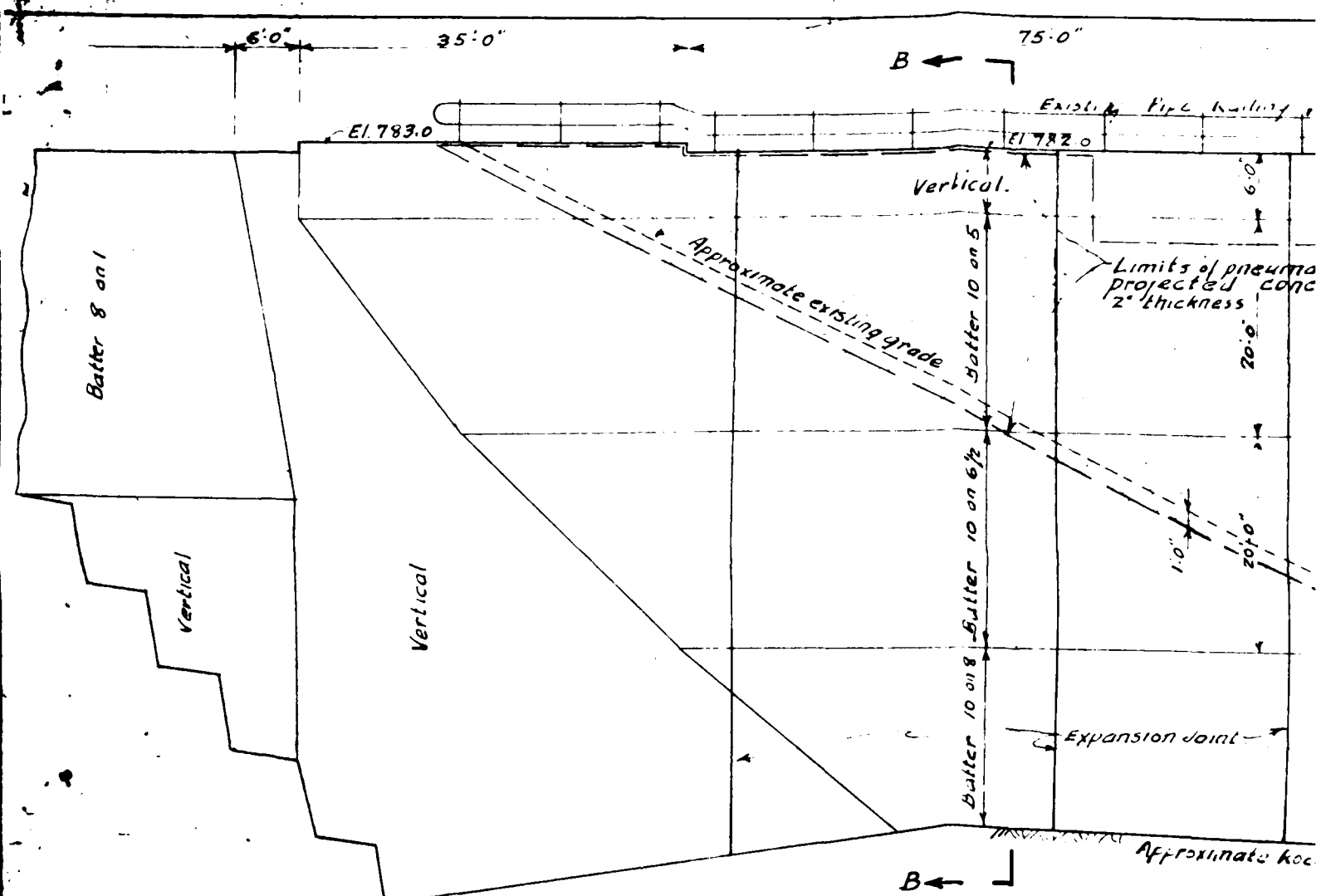


LAYOUT OF 24" PIPE

SCALE 1"=1'-0" NEW YORK STATE DEPARTMENT OF CANALS

amended
from plans for
Hempstead Harbor
New York

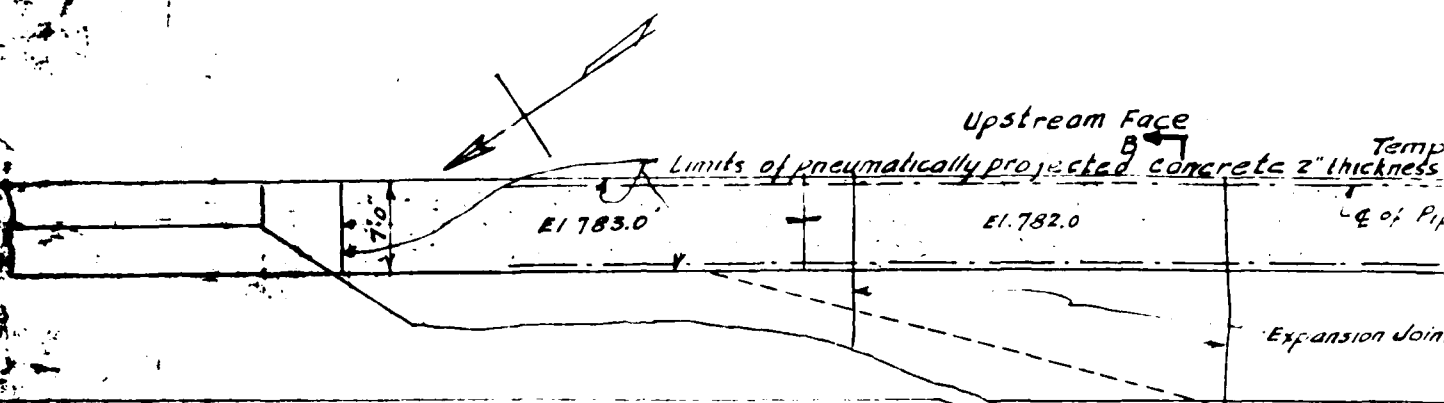
STATE OF NEW YORK
Dam and Waterways Commission



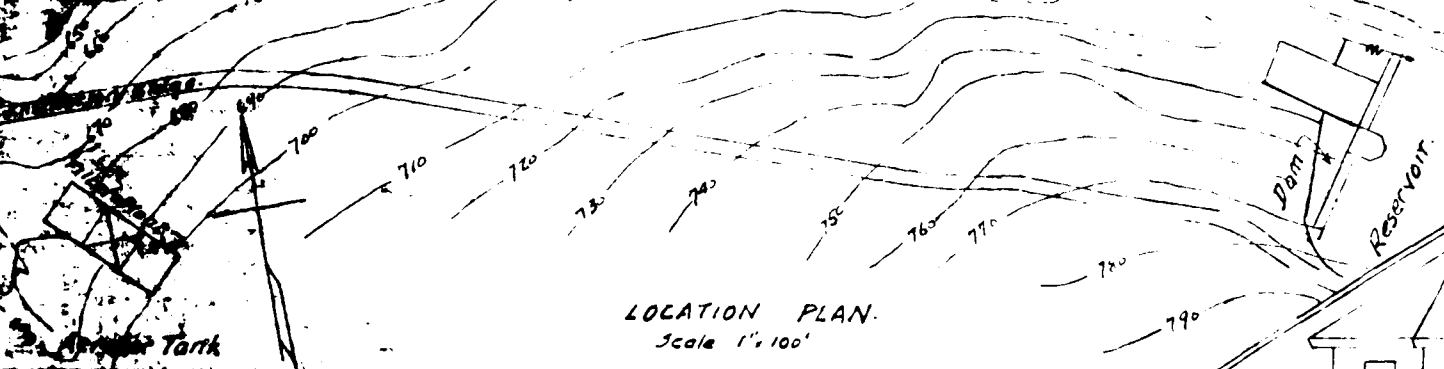
In addition to work on the dam, concrete of the aerator tank shall be restored with pneumatically projected concrete as ordered, Item 102.

B ←

Approximate



In addition to work on the dam, concrete of the aerator tank shall be restored with pneumatically projected concrete as ordered, Item 102.

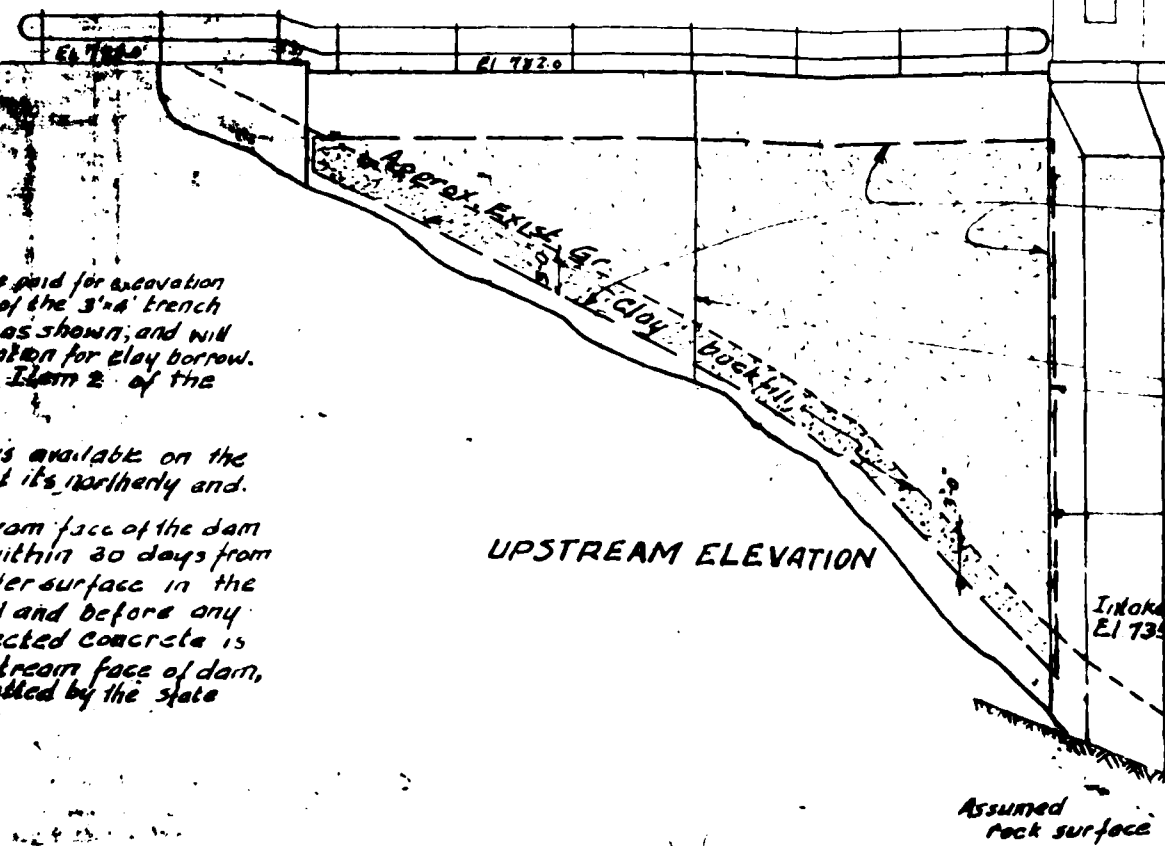


NOTE:

The Contractor will be paid for excavation within the payment lines of the 3' x 4' trench and the 4' x 4' trench as shown, and will also be paid for excavation for clay borrow. See Section 2.16 of Item 2 of the Specifications.

Clay for backfill is available on the Institution property at its northern end.

Work on the upstream face of the dam shall be completed within 30 days from the time that the water surface in the reservoir is lowered and before any pneumatically projected concrete is placed on the downstream face of dam, unless otherwise permitted by the State Architect.



Water level surface

DOWN STREAM ELEVATION

Temporary Copper Dam

Pipe Rail

nts

Existing grade

Blowoff intake Inv. El 729.0

Bottom of intake El 735.0

El. 756.0

Spillway

PART PLAN

SECTION D-D

Intake chamber
superstructure not shown

Vertical
Expansion

Mastic Wt.

Continuous brass
strip 1/4" x 3/16"

Hooked expansion
bolt, 24" o.c.
Each way

Wire fabric

Original surface

Vertical
expansion

NOTE

Limits of application of pneumatically projected concrete as shown are approximate only. Actual limits shall be as determined by the Engineer in the field.

1/4" P. or, Contin.
ITEM NO. 102

Cut away concrete
as shown

METHOD FOR



Limits of application of
pneumatically projected concrete
(1 1/2" thickness) and sealing
expansion joints.

Expansion Joints

See suggested method for
sealing expansion joints.

Corner joints.

Top of Copper Dam El 736.0

Blowoff intake
Inv. El. 729.0

Approx. exist. grade

Clay back fill

Place two lay
wire fabric if
of projected
exceeds 3"

Original Surface

Soft wire ties

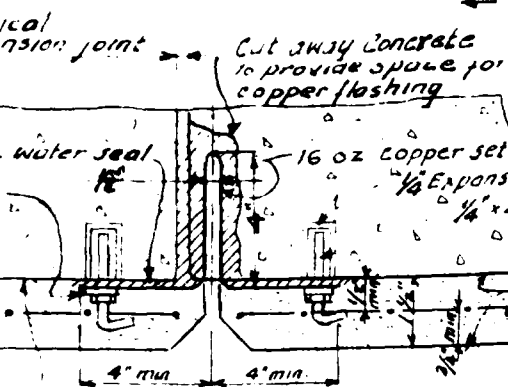
Wire fabric

Pneumatically pr

NOTE:

Remove disintegrated concrete as
ordered by the Engineer. The depth
concrete removed shall not exceed 3"

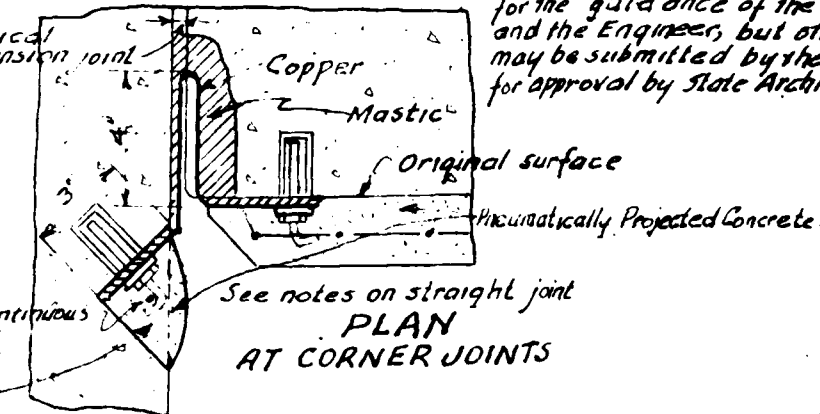
METHOD 1



SECTION A-A

Assumed rock surface

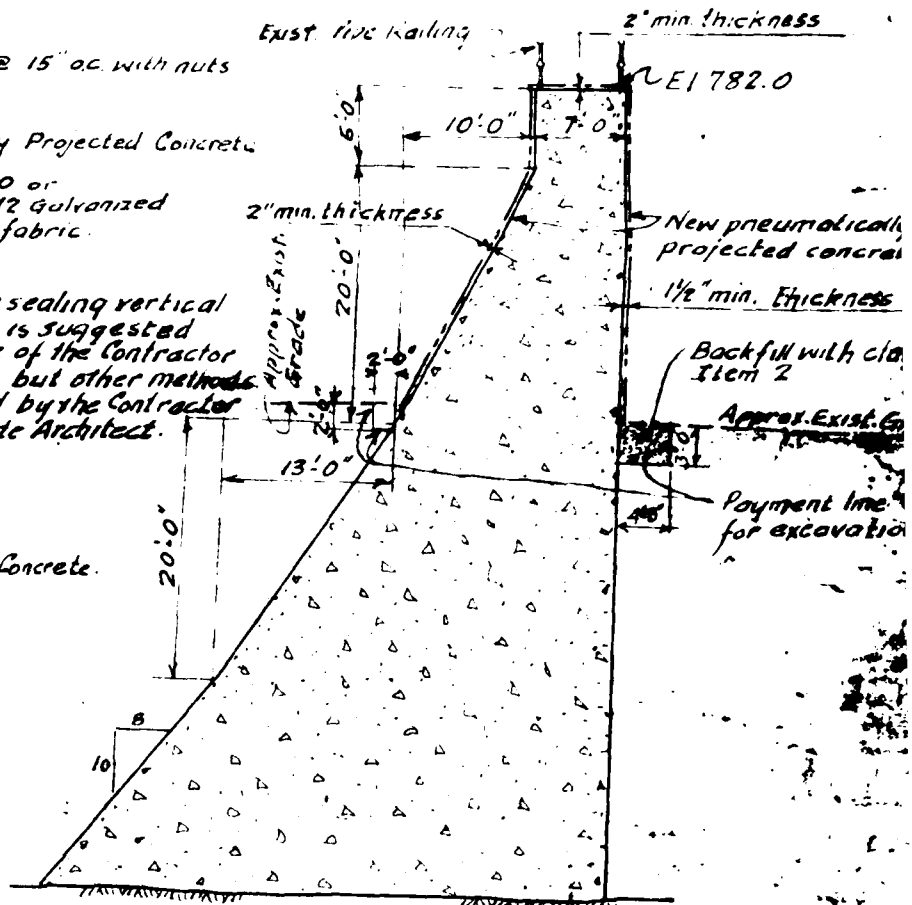
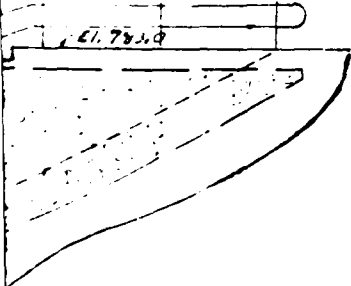
PLAN AT STRAIGHT JOINT



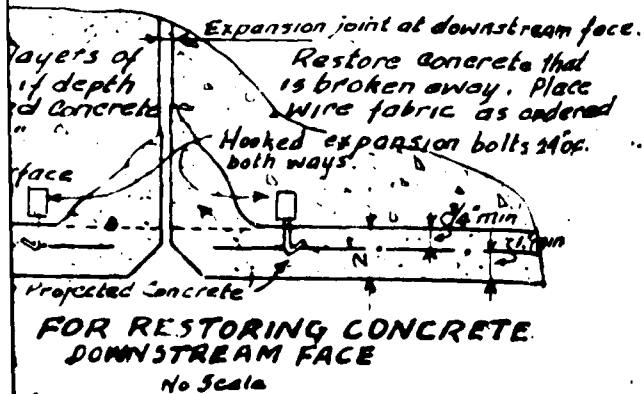
Note - Method for sealing vertical expansion joints is suggested for the guidance of the Contractor and the Engineer, but other methods may be submitted by the Contractor for approval by State Architect.

FOR SEALING EXPANSION JOINTS UPSTREAM FACE

No Scale



SECTION B-B



FOR RESTORING CONCRETE DOWNSTREAM FACE

No Scale

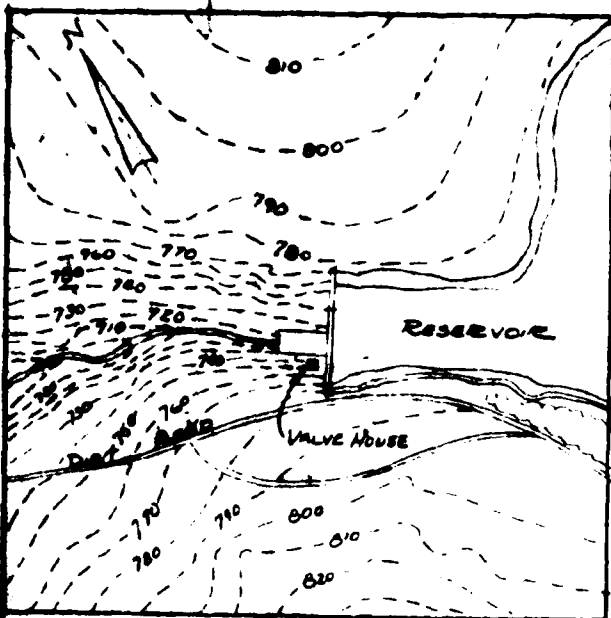
HARLEM VALLEY STATE HOSPITAL

WINGDALE

NEW YORK

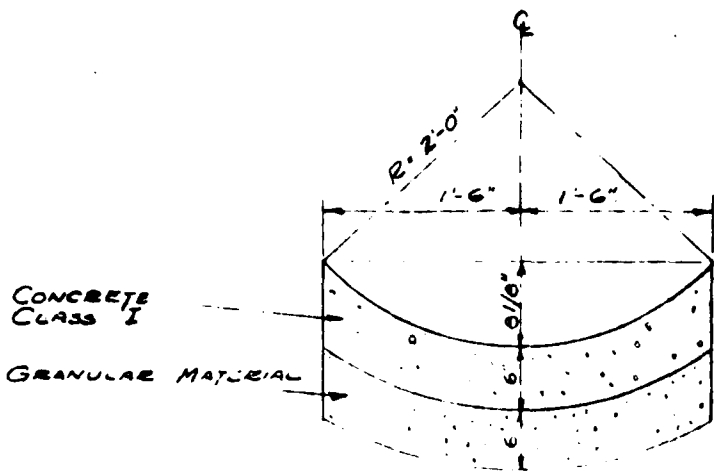
Drawn By J.P.C.	GENERAL ENGINEERING	Project No. 1500
Checked By M.J.F.T.	IMPROVEMENT TO WATER SUPPLY	Spec. No. 1500-GE
Traced By J.P.C.	REPAIRS TO DAM	Scale AS SHOWN
Tring Chkd By M.J.F.T.	PLAN, SECTIONS, AND DETAILS	Date Aug. 15, 1958
Field Check By Letter # 5446 G.S. 9-7-58	STATE OF NEW YORK DEPARTMENT OF PUBLIC WORKS DIVISION OF ARCHITECTURE	Dwg. No. 56/5017
Approved By J.C.B.	C.W. LARSON, STATE ARCHITECT	

Approved By Letter # 30477 P.F.D. to P.W.D.
Dated October 29, 1958



PLOT PLAN
SCALE 1"=100'

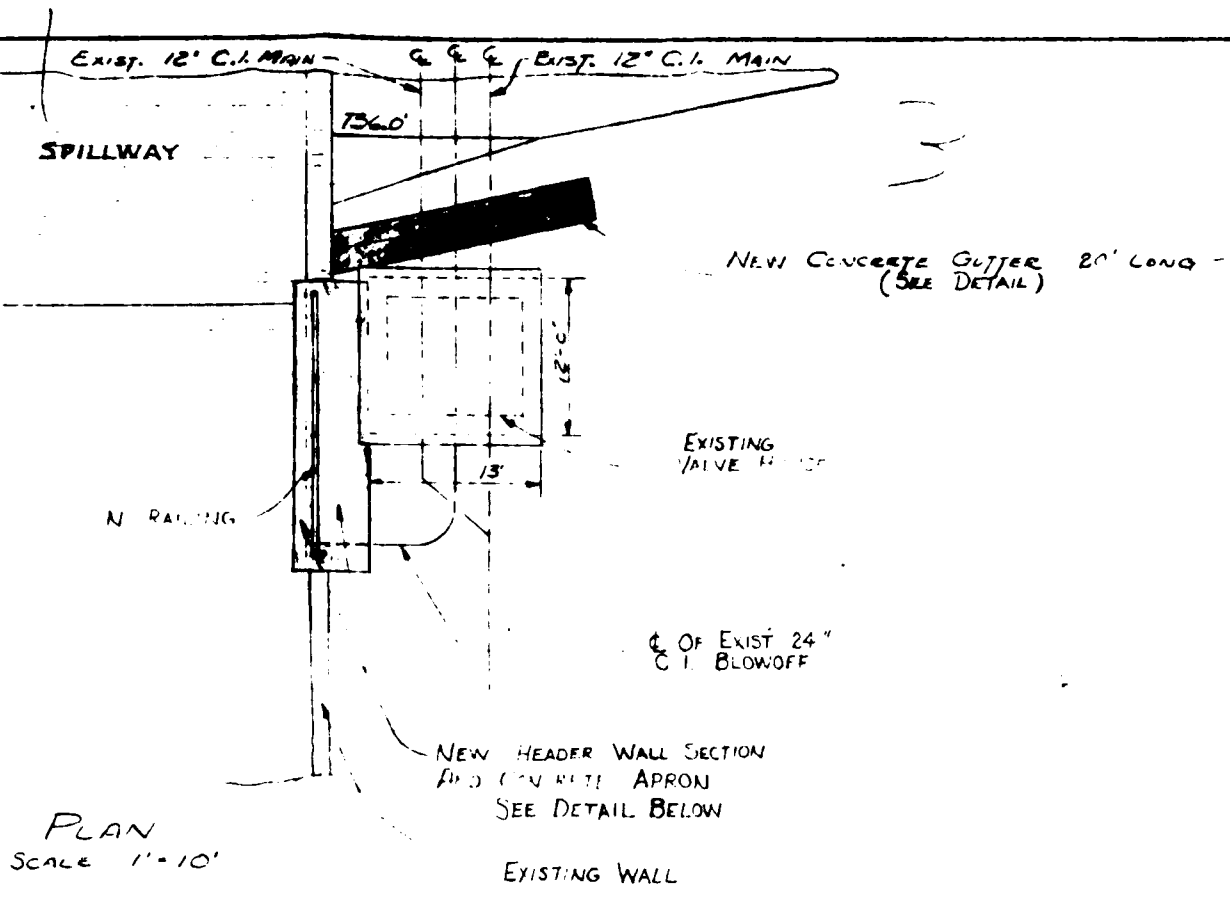
EX. VALVE HOUSE



CONCRETE GUTTER DETAIL

NO SCALE





110
—
—
—

EX. VALVE HOUSE

N METAL RAILING
20 FT LONG

EXIST MASONRY
WALL TO BE REMOVED

5 DOWELS
18" LONG
12" O.C

5 BARS
12" O.C

N 4" WEEP HOLES
6 IN FT. O.C.

CLASS I
CONCRETE

MIN. WALL THICK-
NESS - 12"

3'-0"

#4 BAR
12" O.C

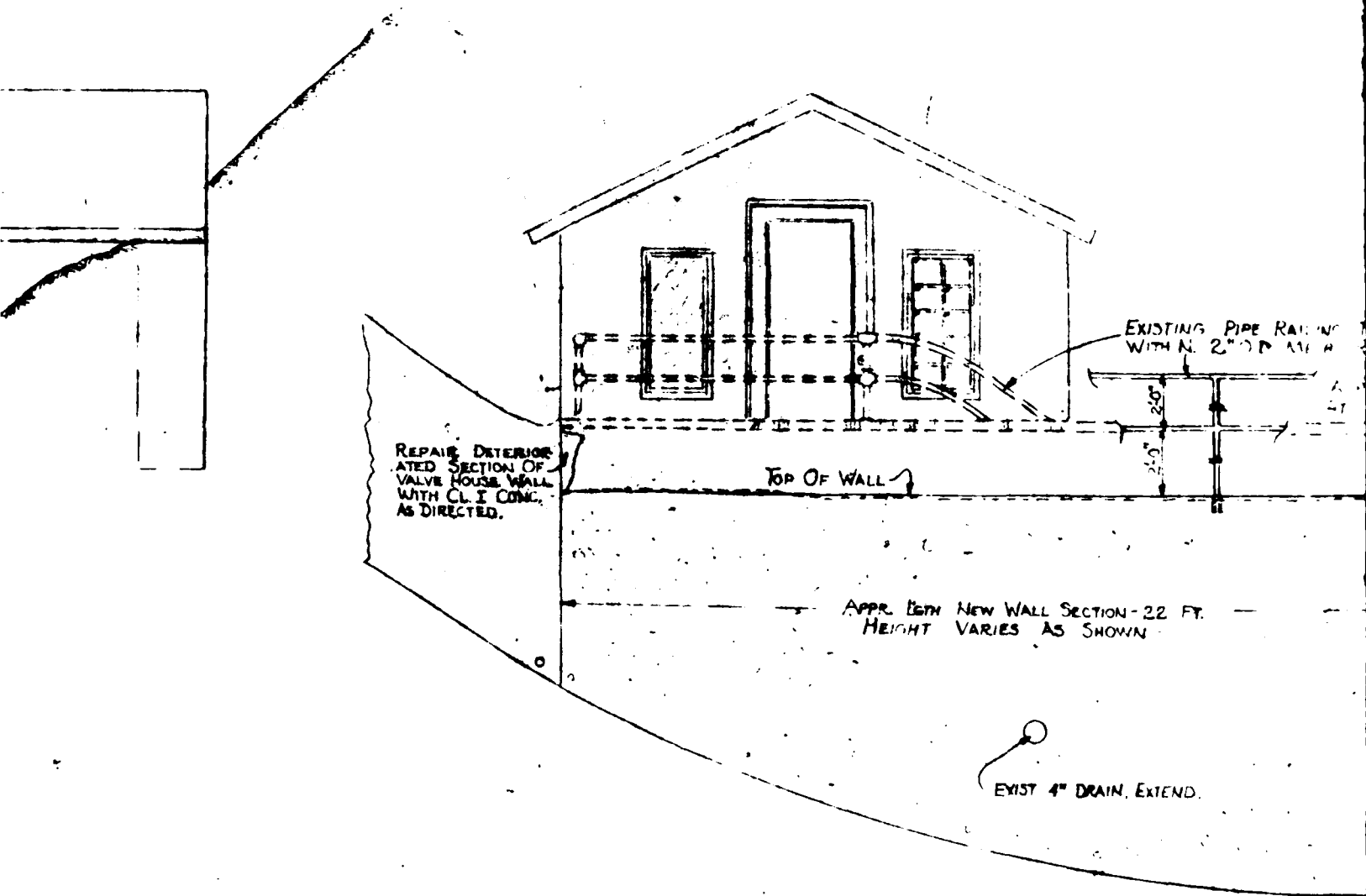
GRAN. MAT'L

EXIST WALL
TO REMAIN

SECTION A-A
SCALE 3/8" = 1'-0"

5 DOWELS, 24" LONG
12" O.C

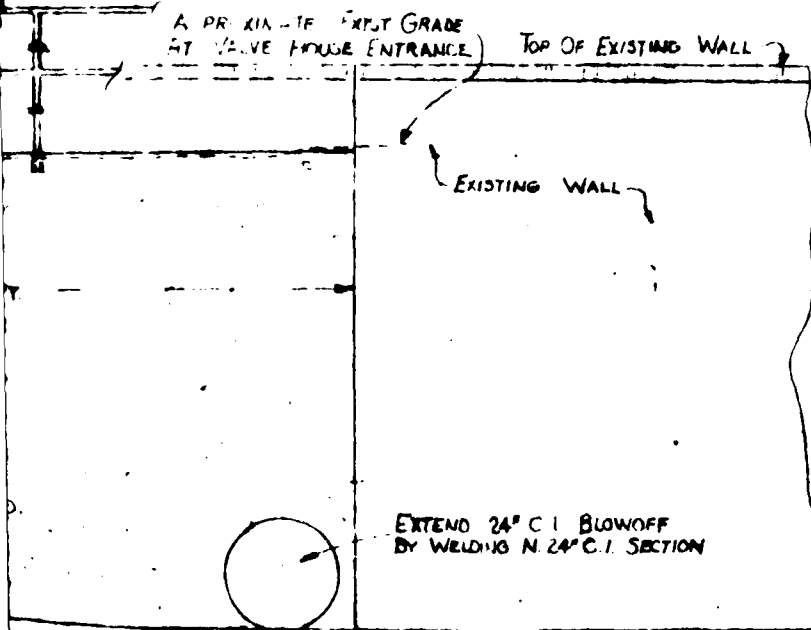
EXIST 24" O.C.



ELEVATION SCALE: $\frac{3}{8}'' = 1'$

5

PIPE RAILING TO BE REPLACED
 2" DIA. METAL RAILING (SPACE H.T. 5 FT O.C.)



SCALE: $\frac{3}{8}$ " = 1'-0"

HARLEM VALLEY STATE HOSPITAL WINGDALE NEW YORK			
REPAIR DAM AND VALVE HOUSE AND APPURTENANT WORK			
GENERAL ENGINEERING			
PLOT PLAN, SECTIONS AND DETAILS			
STATE OF NEW YORK EXECUTIVE DEPARTMENT OFFICE OF GENERAL SERVICES BUILDING DESIGN AND CONSTRUCTION C. V. R. SCHUYLER COMMISSIONER CHARLES S. KAWECKI STATE ARCHITECT			
DRAWN BY	DATE	SCALE	APPROVED BY
		AS SHOWN	
TRACED BY	CHECKED BY	STRUCTURAL CHECK	FIELD CHECK
APPROVED BY _____			
DATED _____ LETTER NO _____			
PROJECT NO 23439		DRAWING NO 70/5040	
SPECIFICATION NO SF 23439 GE			

PHOTOGRAPHS

APPENDIX B



2. UPSTREAM VIEW OF DAM AND GATE HOUSE.



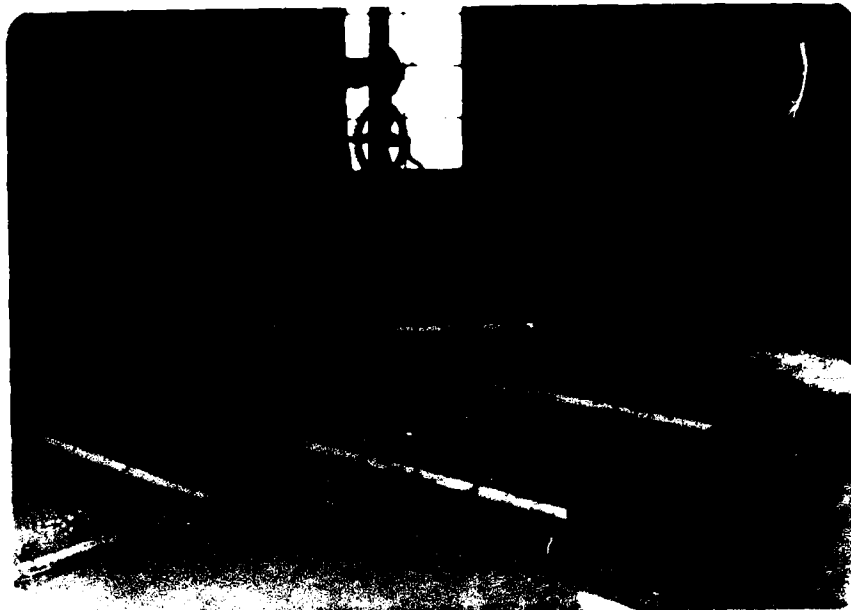
VIEW OF CREST OF SPILLWAY AND RIGHT
SIDE OF DAM.



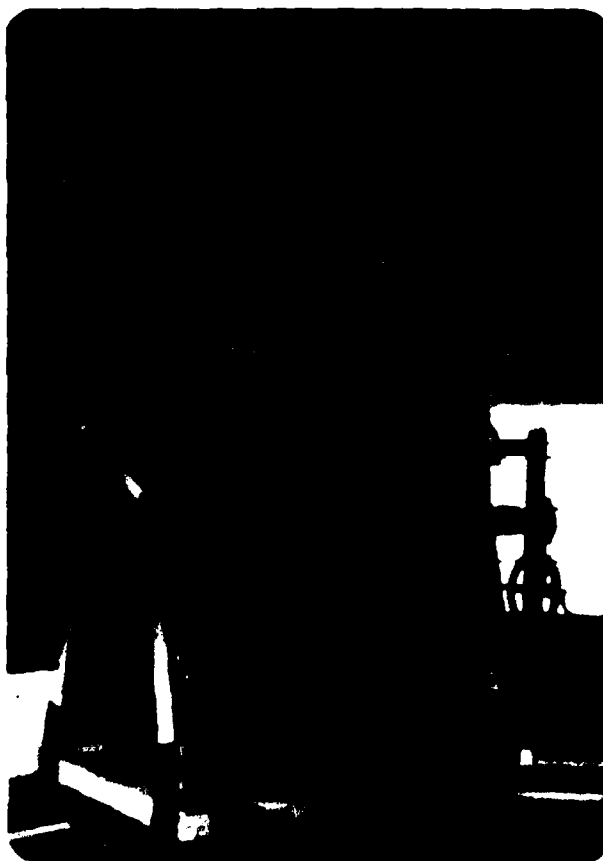
4. DOWNSTREAM FACE OF SPILLWAY.
NOTE: MINOR SEEPAGE.



5. VIEW OF DOWNSTREAM FACE OF DAM
LEFT WING AND SPILLWAY.



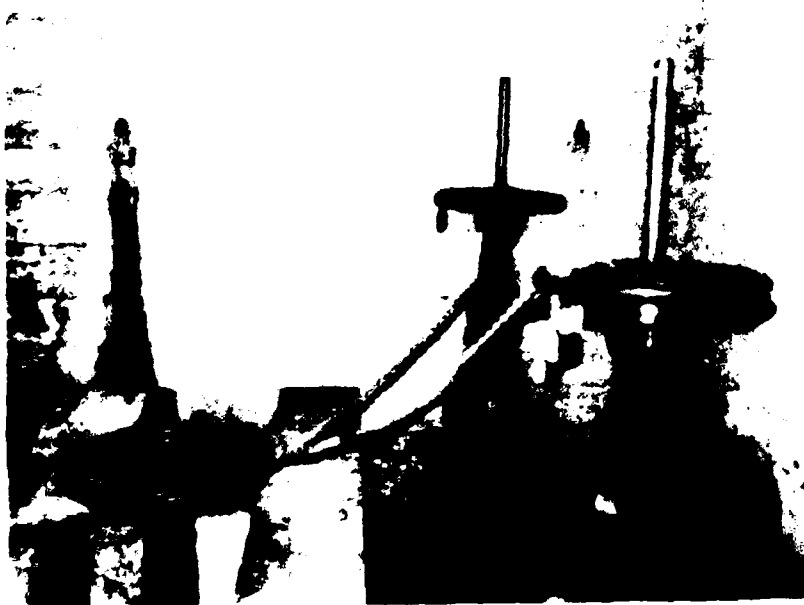
6. VIEW OF INTERIOR OF GATE HOUSE.



7. VIEW OF MANUAL HOIST FOR GATES.



8. VIEW OF LOWER DOWNSTREAM FACE, SPILLWAY
TAILRACE TRAINING WALL AND VALVE HOUSE.



9. VIEW OF DOWNSTREAM CONTROL VALVES.



10. VIEW OF DOWNSTREAM SPILLWAY TAILRACE
AND 24-INCH RESERVOIR DRAIN OUTLET.



11. VIEW OF SPILLWAY CHANNEL LOOKING
DOWNSTREAM.



12. DOWNSTREAM TOE OF DAM ON LEFT ABUTMENT.
NOTE: SPALLED CONCRETE SURFACE, OVERGROWN
WET ABUTMENT.



13. CLOSE UP VIEW OF DOWNSTREAM FACE OF
SPILLWAY. NOTE: BROKEN AND MISSING
PNEUMATICALLY APPLIED CONCRETE.

VISUAL INSPECTION CHECKLIST

APPENDIX C

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Harlem Valley Reservoir

Fed. I.D. # NY 273 DEC Dam No. 677

River Basin Housatonic

Location: Town Wingdale County Dutchess

Stream Name None

Tributary of Swan River

Latitude (N) 41°33' Longitude (W) 73°33'

Type of Dam Concrete Gravity

Hazard Category High

Date(s) of Inspection June 12, 1980

Weather Conditions Fair - 65° to 70°

Reservoir Level at Time of Inspection 3 inches below spillway crest

b. Inspection Personnel Harvey S. Feldman -

Joseph J. Fenton, Jr.

c. Persons Contacted (Including Address & Phone No.)

MR James Billings - Harlem Valley Psychiatric Hos - Wingdale NY 12594

MR George Ackon - " " " " " " "

(914) 832-6611

d. History:

Date Constructed 1918 Date(s) Reconstructed

Designer New York State

Constructed By New York State

Owner New York State - Harlem Valley State Hosp.

) Embankment — Section Not Applicable — Concrete Dam

a. Characteristics

(1) Embankment Material NA

(2) Cutoff Type NA

(3) Impervious Core NA

(4) Internal Drainage System NA

(5) Miscellaneous NA

b. Crest

(1) Vertical Alignment NA

(2) Horizontal Alignment NA

(3) Surface Cracks NA

(4) Miscellaneous NA

c. Upstream Slope

(1) Slope (Estimate) (V:H) NA

(2) Undesirable Growth or Debris, Animal Burrows NA

(3) Sloughing, Subsidence or Depressions NA

(4) Slope Protection _____

(5) Surface Cracks or Movement at Toe _____

d. Downstream Slope *10A*

(1) Slope (Estimate - V:H) _____

(2) Undesirable Growth or Debris, Animal Burrows _____

(3) Sloughing, Subsidence or Depressions _____

(4) Surface Cracks or Movement at Toe _____

(5) Seepage _____

(6) External Drainage System (Ditches, Trenches; Blanket) _____

(7) Condition Around Outlet Structure _____

(8) Seepage Beyond Toe _____

e. Abutments - Embankment Contact

(1) Erosion at Contact _____

(2) Seepage Along Contact _____

3) Drainage System

a. Description of System None existing

b. Condition of System _____

c. Discharge from Drainage System _____

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, etc.) None installed

5) Reservoir

- a. Slopes Vary - 1V to 1 1/4H to 2V:1H.
generally, stable
- b. Sedimentation little apparent
- c. Unusual Conditions Which Affect Dam None

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) High - Hospital
Complex located \approx 1/2 mile Downstream
- b. Seepage, Unusual Growth Seepage midway up slopes
Near top of Dam on Both abutments, Abutments separated by crest.
- c. Evidence of Movement Beyond Toe of Dam None
- d. Condition of Downstream Channel Clogged with brush and
other growth

7) Spillway(s) (Including Discharge Conveyance Channel)

Ogee shaped crest - Centrally located in Dam

- a. General Spillway was gunited about 15 years
ago as part of seepage treatment for dam.
- b. Condition of Service Spillway Crest - generally good -
Some peeling of gunite. Downstream face
in poor condition due to "bubbling" and
peeling of gunite - small amounts of
seepage from under gunite.

c. Condition of Auxiliary Spillway - None exists

d. Condition of Discharge Conveyance Channel Steep-sided
channel, Slopes appear to be stable, Channel
is overgrown and filled with brush and vegetation.

) Reservoir Drain/Outlet

Type: Pipe ☒ Conduit ☐ Other ☐

Material: Concrete ☐ Metal ☒ Other ☐

Size: 24 inches Length 30.5 feet

Invert Elevations: Entrance 729 Exit 723

Physical Condition (Describe): Unobservable (partially

Material: Steel is sound where visible

Joints: good Alignment good

Structural Integrity: good

Hydraulic Capability: good

Means of Control: Gate ☒ Valve ☐ Uncontrolled ☐

Operation: Operable ☒ Inoperable ☐ Other ☐

Present Condition (Describe): good - gate is
operated annually to clear silt from opening

1) Structural

- a. Concrete Surfaces Concrete Surfaces were erected in 1965. The granite is in satisfactory condition higher on the face of the dam but is bubbling and peeling over the entire spillway surface and lower down on the dam
- b. Structural Cracking None apparent
- c. Movement - Horizontal & Vertical Alignment (Settlement) None Apparent
- d. Junctions with Abutments or Embankments Appear to be good
Some seepage exist about midspan down on each slope. One still drops up on down on the
- e. Drains - Foundation, Joint, Face - None in Service
- f. Water Passages, Conduits, Sluices One built to take seepage on left abutment to tailrace is clogged with debris.
- g. Seepage or Leakage Some seepage through peeling granite low down on dam surface, especially on left abutment - Considerable seepage from under peeling granite on lower half of spillway

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. HARLEM VALLEY RESERVOIR (INVENTORY--ETC(U)
SEP 80 E O'BRIEN DACW51-79-C-0001

DACW51-79-C-0001
NL

409:040

END
DATE
FILMED
1-81
DTIC

- h. Joints - Construction, etc. Minor spalling of concrete on all construction joints of downstream face and Dam crest.
- i. Foundation Not visible - but from channel outcrops it appears to be micaceous schist.
- j. Abutments Rock covered with overburden and vegetation - Left abutment soft below spillway.
- k. Control Gates Appear to be in good working order. One has jammed screen, but gate remains operable.
- l. Approach & Outlet Channels Approach channel not visible. Outlet channel - Rock base, steep sided. Clogged with vegetation.
- m. Energy Dissipators (Plunge Pool, etc.) None exist.
- n. Intake Structures Good condition - well maintained. Used continuously and regularly. Exts. as it appears in drawings.
- o. Stability Appears stable - No evidence of movement or deformation.
- p. Miscellaneous None

HYDROLOGIC DATA AND COMPUTATIONS

APPENDIX D

TAMS

Job No. 1551-06

Sheet 1 of 4

Project HARLEM VALLEY DAM PHASE 1 INSPECTION

Date JUNE 17 1981

Subject Hydrologic / Hydraulic Computations

By ELC

Inflow Hydrograph

Ch'k. by _____

Rainfall converted to runoff due to small basin size.

HR	Percent	Acc. Rainfall	INCR RAIN	RUN OFF		TOTAL
				LAND	Reservoir	
1	.45	.1	0.1	0	0.74	0.74
2	.89	.2	0.1	0	0.74	0.74
3	1.34	.3	0.1	0	0.74	0.74
4	1.70	.401	0.101	.28	0.75	1.03
5	2.24	.502	0.101	.28	0.75	1.03
6	2.68	.600	0.098	0	0.73	0.73
7	4.74	1.062	0.46	100.0	3.40	103.4
8	6.26	1.402	0.34	66.8	2.52	69.3
9	8.05	1.803	0.401	83.8	2.97	86.8
10	9.84	2.204	0.401	83.8	2.97	86.8
11	11.63	2.605	0.401	83.8	2.97	86.8
12	13.42	3.006	0.401	83.8	2.97	86.5
13	21.65	4.550	1.844	485.	13.6	499.
14	31.50	7.056	2.206	586.	16.3	602.
15	43.80	9.812	2.756	739.	20.4	759.
16	75.12	16.827	7.015	1920.	51.9	1972.
17	86.67	19.414	2.587	692.	19.1	711.
18	95.70	21.437	2.023	535.	15.	550.
19	96.42	21.598	0.161	17.	1.2	18.2
20	97.14	21.759	0.161	17.	1.2	18.2
21	97.85	21.918	0.159	16.	1.2	17.2
22	98.57	22.080	0.162	17.	1.2	18.2
23	99.28	22.239	0.159	16.	1.2	17.2
24	100.00	22.400	0.161	17.	1.2	18.2

24 Hr. 10 SQUARE PMP ~ 28 ins.

loss 20% (Hog Branch factor) 22.4"

Assume 0.1 in/hr loss on land area.

LAND AREA = 278.3

LAKE AREA = 7.4 acres.

TAMS

Job No. 1551-06

Sheet 2 of 4

Project HARLEM VALLEY DAM PHASE 1

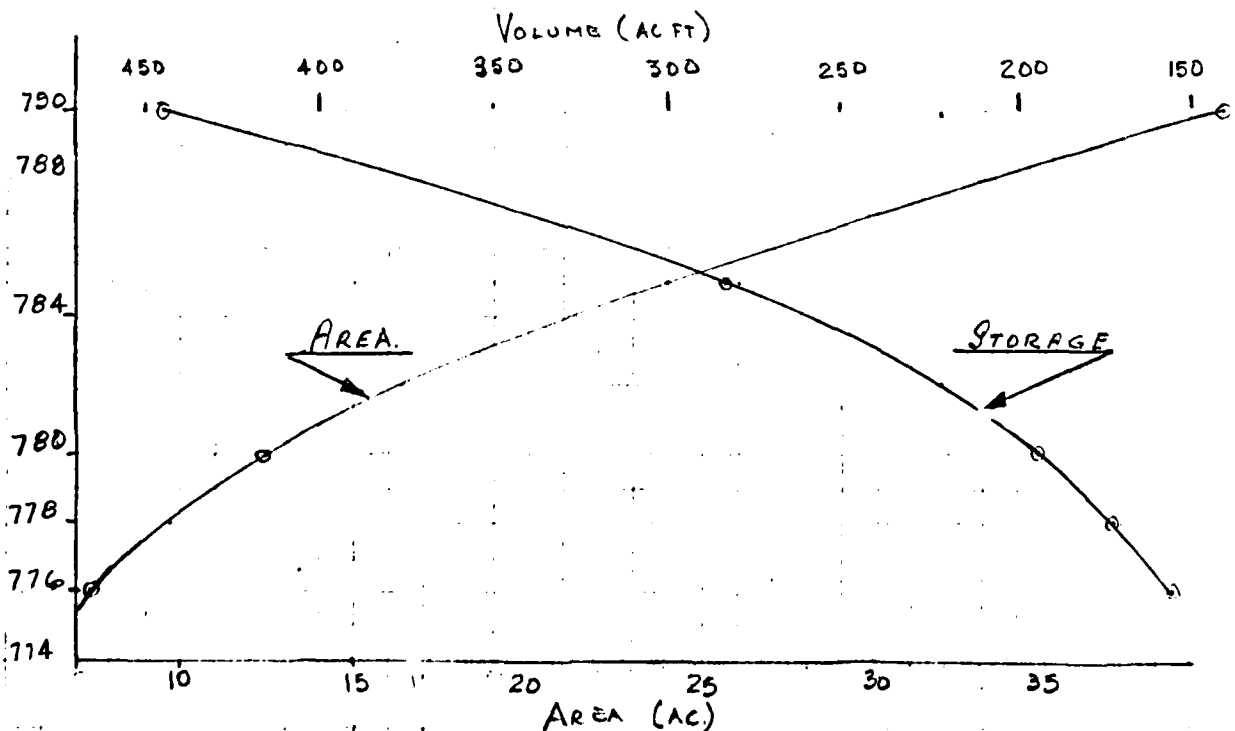
Date JUNE 27, 1980

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS.

By DLC

Ch'k. by _____

EL	AREA	ΔH	MEAN AREA	Δ VOLUME (AC FT)	STORAGE (AC FT)
776	7.4				155
		2	8.6	17.2	
778	9.8				172.2
		2	10.95	21.9	
780	12.1				194.1
		5	18.05	90.25	
785	24.0				284.35
		5	31.95	159.75	
790	39.9				444.1



TAMS

Job No. 1551-06

Project HARLEM VALLEY DAM PHASE 1 INSPECTION

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS

Sheet 3 of 4

Date JUNE 26 1980

By DLC.

Ch'k. by _____

SPILLWAY CREST EL 776.0

$H_d \sim 4.0'$

" LENGTH 30.0'

EL	H_c/H_d	C	Q	STORAGE
776	0		0	155
778	5	3.66	310	172
780	10	4.03	970	194
* 782	15	4.30	1900	222
785	~ 4.3		3480	284
790	~ 4.3		6760	444

FLOW OVER DAM

EL 782 C = 2.67 L = 189

TAMS

Job No. 1551-06

Project HARLEM VALLEY DAM INSPECTION

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS.

D/S VALLEY CROSS SECTION

Sheet 4 of 4

Date JUNE 27, 1990

By D.L.C

Ch'k. by _____

STATION	1000	DISTANCE	ELEVATION
SLOPE	0.11	7800	700
		7920	650
		7940	640
		7995	625
		8005	625
		8010	630
		8080	640
		8150	650
		8420	700

MN
 425.42 500.94 500.94
 72 473 473
 476 504 504

HYDROGRAPH AT STA 1 FOR PLAN 1, RATIO 2

0.	0.	1.	0.	35.	43.	43.
23.	20.	30.	980.	275.	9.	9.
9.	9.	9.	0.	0.	0.	0.

PEAK 6-HOUR 24-HOUR 72-HOUR TOTAL VOLUME
 CFS 965. 435. 119. 95. 2862.
 CFS 24. 11. 7. 81.
 INCHES 1.37 0.66 0.46 9.86
 MM 212.71 250.47 250.47 250.47
 AC-FT 201. 237. 237. 237.
 THOUS CU M 244. 292. 292. 292.

HYDROGRAPH ROUTINE

PRESERVOIR ROUTINE

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPTT	INAME	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

GLASS	ELCSS	AVG	IRFS	ISAME	IPMP	LSTP
0.0	0.000	0.00	1	1	0	0

NSTPS	NSTDCL	LAG	AMSKK	X	TSC	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	155.	-1

STAGE 776.00 776.00 782.00 785.00 780.00

FLO. 0.00 310.00 1900.00 3420.00 6760.00

CAPACITY# 155. 172. 194. 222. 254. 444.

ELEVATIONS 776. 779. 780. 782. 785. 780.

CPEL	SPNIO	COOW	EXPM	ELEV	COEL	CAPEA	EXPL
776.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAW DATA
 TOPFL 782.0
 COON 2.7
 EXPS 1.5
 DAMWID 180.

STATION 10, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW	
1.	1.
17.	56.
23.	18.
1.	1.
45.	132.
80.	541.
269.	0.
0.	0.

STORAGE	
155.	155.
161.	161.
155.	155.
152.	152.
205.	205.
159.	159.
170.	170.
152.	152.

00(4)	00(2)	00(3)	FLNVT	FLMAX	RLNTH	SFL
0000	0000	0000	625.0	700.0	1900.	.11000

CROSS SECT.	COORDINATES	-STA	ELEV	STA	ELEV	-FTC
75	100	7020.00	650.00	7940.00	640.00	7
250	100	7300	645.00	8150.00	650.00	

STORAGE	0.00	1.74	5.73	13.45	24.98	37.92	58.08	78.94	100.78	123.49
	147.05	171.47	164.74	222.88	249.88	277.73	306.44	336.01	366.44	397.73
CUTFLOW										
	6.68	28.68	106.64	295.33	645.22	1225.06	2011.95	309450.34	443668.64	599559.37
	77749.81	676464.62	1196609.43	1436668.68	1698171.34	1950615.93	2284037.91	2608550.82	2954270.57	3321336.19
STAGE										
	12.62	22.65	672.49	476.24	640.79	644.74	648.69	652.63	656.58	660.53
	64.47	841.42	672.37	676.32	640.26	646.21	598.16	692.11	696.05	700.03
FLOW										
	0.00	22.68	106.64	295.33	645.22	1225.06	2011.95	309450.34	443668.64	599559.37
	77749.81	976566.62	1196609.43	1436668.68	1698171.34	1950610.93	2284037.91	2608550.82	2954270.57	3321336.19

STATION 100, PLAN 1, RTIO 1

	IN	OUTFLOW			
1.	6.	0.	0.	44.	80.
2.	2.	0.	0.	0.	79.
3.	24.	565.	1444.	1330.	540.
4.	25.	15.	13.	0.	275.
5.	0.	0.	0.	0.	0.
6.	0.	0.	0.	0.	0.
7.	0.	0.	0.	0.	0.
8.	0.	0.	0.	0.	0.
9.	0.	0.	0.	0.	0.
10.	0.	0.	0.	0.	0.
11.	0.	0.	0.	0.	0.
12.	0.	0.	0.	0.	0.
13.	0.	0.	0.	0.	0.
14.	0.	0.	0.	0.	0.
15.	0.	0.	0.	0.	0.
16.	0.	0.	0.	0.	0.
17.	0.	0.	0.	0.	0.
18.	0.	0.	0.	0.	0.
19.	0.	0.	0.	0.	0.
20.	0.	0.	0.	0.	0.
21.	0.	0.	0.	0.	0.
22.	0.	0.	0.	0.	0.
23.	0.	0.	0.	0.	0.
24.	0.	0.	0.	0.	0.
25.	0.	0.	0.	0.	0.
26.	0.	0.	0.	0.	0.
27.	0.	0.	0.	0.	0.
28.	0.	0.	0.	0.	0.
29.	0.	0.	0.	0.	0.
30.	0.	0.	0.	0.	0.
31.	0.	0.	0.	0.	0.
32.	0.	0.	0.	0.	0.
33.	0.	0.	0.	0.	0.
34.	0.	0.	0.	0.	0.
35.	0.	0.	0.	0.	0.
36.	0.	0.	0.	0.	0.
37.	0.	0.	0.	0.	0.
38.	0.	0.	0.	0.	0.
39.	0.	0.	0.	0.	0.
40.	0.	0.	0.	0.	0.
41.	0.	0.	0.	0.	0.
42.	0.	0.	0.	0.	0.
43.	0.	0.	0.	0.	0.
44.	0.	0.	0.	0.	0.
45.	0.	0.	0.	0.	0.
46.	0.	0.	0.	0.	0.
47.	0.	0.	0.	0.	0.
48.	0.	0.	0.	0.	0.
49.	0.	0.	0.	0.	0.
50.	0.	0.	0.	0.	0.
51.	0.	0.	0.	0.	0.
52.	0.	0.	0.	0.	0.
53.	0.	0.	0.	0.	0.
54.	0.	0.	0.	0.	0.
55.	0.	0.	0.	0.	0.
56.	0.	0.	0.	0.	0.
57.	0.	0.	0.	0.	0.
58.	0.	0.	0.	0.	0.
59.	0.	0.	0.	0.	0.
60.	0.	0.	0.	0.	0.
61.	0.	0.	0.	0.	0.
62.	0.	0.	0.	0.	0.
63.	0.	0.	0.	0.	0.
64.	0.	0.	0.	0.	0.
65.	0.	0.	0.	0.	0.
66.	0.	0.	0.	0.	0.
67.	0.	0.	0.	0.	0.
68.	0.	0.	0.	0.	0.
69.	0.	0.	0.	0.	0.
70.	0.	0.	0.	0.	0.
71.	0.	0.	0.	0.	0.
72.	0.	0.	0.	0.	0.
73.	0.	0.	0.	0.	0.
74.	0.	0.	0.	0.	0.
75.	0.	0.	0.	0.	0.
76.	0.	0.	0.	0.	0.
77.	0.	0.	0.	0.	0.
78.	0.	0.	0.	0.	0.
79.	0.	0.	0.	0.	0.
80.	0.	0.	0.	0.	0.
81.	0.	0.	0.	0.	0.

STOR

0000
0000
0000
0000
0000
0000
0000
0000
0000

STAGE

[illegible]

MAXIMUM STORAGE =

MAXIMUM STAGE IS 627.5

STATION 100, PLAN 1, RYIO 2

OUTFLOW	1.	0.	1.	0.
1.				

[illegible]

MAXIMUM STORAGE = 7.

MAXIMUM STAGE IS 626.2

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION STATION AREA PLAN RATIO 1 RATIO 2 RATIOS APPLIED TO FLOWS

1.00 .50

HYDROGRAPH AT 1 1.45 1 1972 986.
 (1.17) (55.94) (27.92) (

ROUTED TO 1 1.45 1 1459 723.
 (1.17) (41.30) (20.39) (

ROUTED TO 1 1.45 1 1444 714.
 (1.17) (40.90) (20.21) (

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

ELEVATION	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
STAGE	776.00	776.00	782.00
OUTFLOW	155.	155.	222.
	0.	0.	1000.

RATIO OF OF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	781.05	3.60	209.	1450.	0.00	16.00	0.00
.50	775.24	0.00	186.	720.	0.00	16.00	0.00

PLAN 1 STATION 100

RATIO	MAXIMUM FLOW/CFS	MAXIMUM STAGE/FT	TIME HOURS
1.00	1444.	627.5	16.00
.50	714.	526.2	16.00

STABILITY ANALYSIS

APPENDIX E

TAMS

Job No. 1531-06

Sheet 1 of

Project 1531 Dam Improv. Huron Valley Reservoir

Date 8-15-30

Subject Stability Analysis

By JIF

Ch'k. by

Assumptions

- 1) The Unit weight of Concrete is assumed to be 150 lbs/cuft
- 2) Ice load of 5000 lbs/ft² acting about 1ft from the top of the dam; (C.O.E. Criteria)
- 3) Angle of Internal Resistance of foundation rock is assumed to be 45°
- 4) Dam Site is in Seismic Zone 2.

Loading Conditions

- 1) Case I - Normal Loading; Lake level at Spillway Crest EL. 776. No Ice load.
- 2) Case II - Normal Loading; Lake level at Spillway Crest - EL. 776, With ice load.
- 3) Case III - Unusual Loading - Lake level at 1/2 PMF
- 4) Case IV - Extreme Loading - Lake level at PMF
- 5) Case V - Unusual Loading - Lake level at Spillway Crest and earthquake force at 0.05g.

Stability Criteria

- a) Overturning - Resultant force shall fall within the middle third of the base for cases I and II. The resultant force shall fall within the middle 1/2 of the base for cases III, IV, V.
- b) Sliding - For case I and II, friction factor of safety against sliding is to be 1.5. For case III and IV friction factor of safety against sliding is to be 1.25. For case V friction factor of safety is to be 1.1

TAMS

Job No. 1551-06

Sheet 2 of

Project Nys Dam Insp. Harlem Valley Reservoir

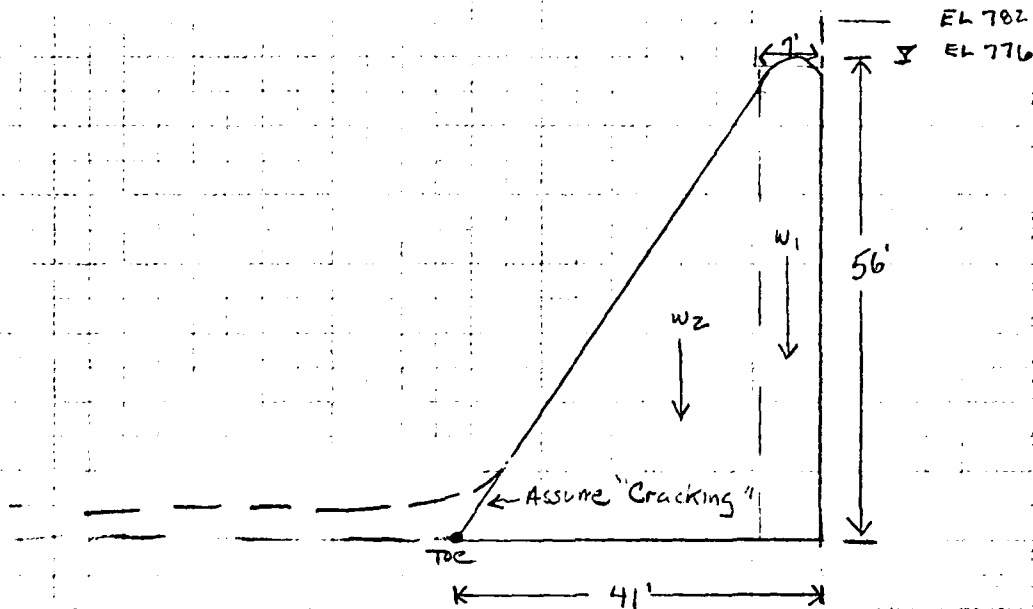
Date 8-15-80

Subject Stability Analysis - overflow section

By JJF

Ch'k. by

Dead Load



EM about TOE

$w_1 = 54' \times 7' (0.150) =$	$56.7 \times 37.5 =$	$m_2 =$
$w_2 = 52' \times 34' (0.150) =$	$265.2 \times 22.6 =$	5993.52

$$\Sigma FV = 321.9$$

$$\Sigma M_2 = 8119.77$$

$$\bar{x} = \frac{8119.77}{321.9} = \underline{\underline{25.22}}$$

$$E_{ny} = 28(56.7) + 265.2(18) = 6361.2$$

$$\bar{y} = \frac{6361.2}{321.9} = \underline{\underline{19.76}}$$

TAMS

Job No. 1551-0 G

Sheet 3 of

Project Nys Dam Insp - Harlem Valley

Date 8-15-90

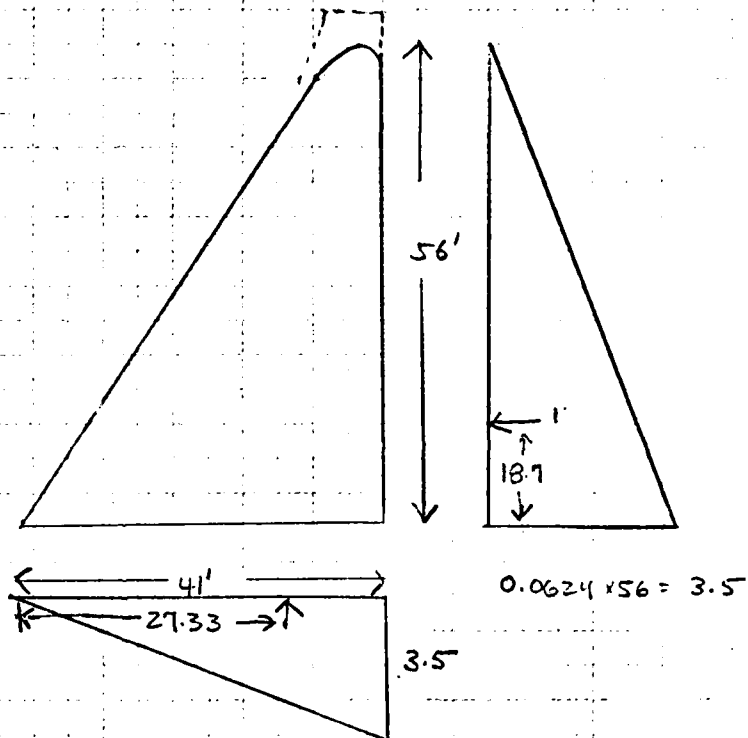
Subject Stability Analysis

By JJP

Ch'k. by

Hydrostatic Forces

a) Normal Loading



Σ M TOE

$$P = \frac{1}{2} \times 3.5 \times 56 = \frac{K}{98} \times \frac{MA}{18.7} = \frac{M_o}{1832.6}$$

$$U = \frac{1}{2} \times 3.5 \times 41 = \frac{71.75}{27.33} = \frac{1960.92}{\quad}$$

$$\Sigma F_V = 11.75 \uparrow$$

$$\Sigma F_H = 98.0 \leftarrow$$

$$\Sigma M_o = 3793.52$$

ICE LOAD

$$\frac{K}{5.0} \times \frac{MA}{55.5} = \frac{M_o}{277.5}$$

$$\Sigma F_H = 5.0 \leftarrow$$

$$\Sigma M_o = 277.5$$

TAMS

Job No. 1551-06

Project Nys Dam Insp. Harlem Valley Res.

Subject Stability Analysis

Sheet 4 of

Date 8-18-90

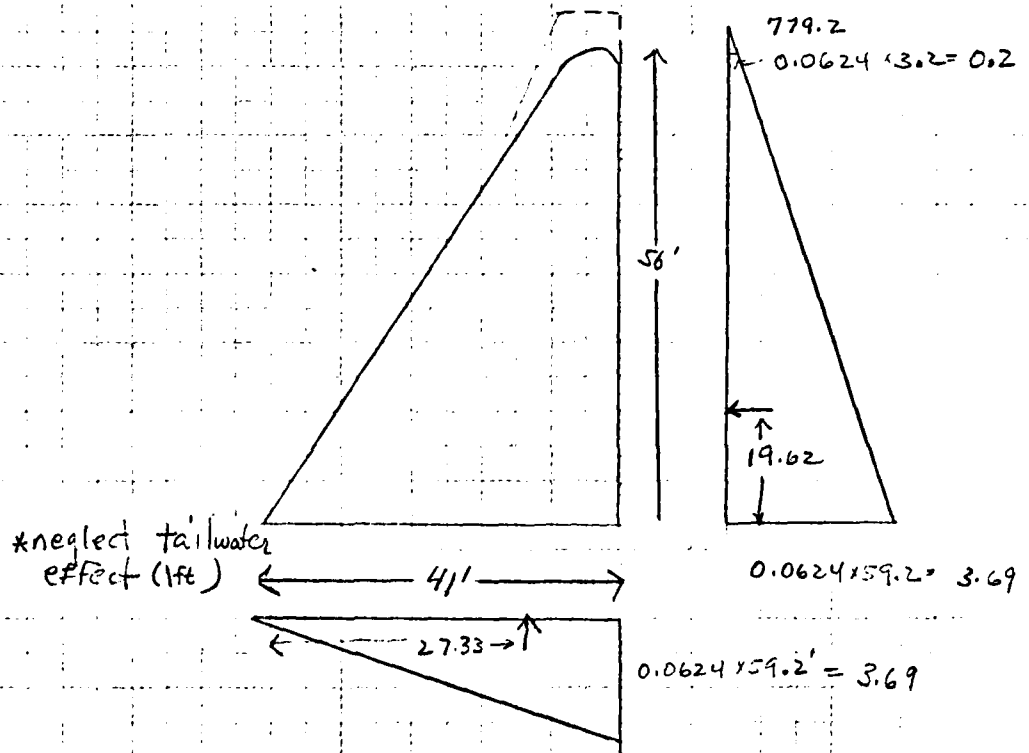
By JJF

Ch'k. by

Hydrostatic Forces

b) $\frac{1}{2}$ PMF

WS ELEV = 779.2



$$P_H = \frac{3.69 + 0.2}{2} (56) = 108.92 \leftarrow \frac{K}{19.62} \times \frac{M_H}{2137.0} = \frac{M_0}{2137.0}$$

$$U = \frac{1}{2} (3.69) (41') = 75.64 \uparrow \quad 27.33 = \frac{2067.37}{4204.4}$$

$$\Sigma F_V = 75.64$$

$$\Sigma F_H = 108.92$$

TAMS

Job No. 1551-06

Project NYS Dam Insp - Harlem Valley

Subject Stability Analysis

Sheet 5 of _____

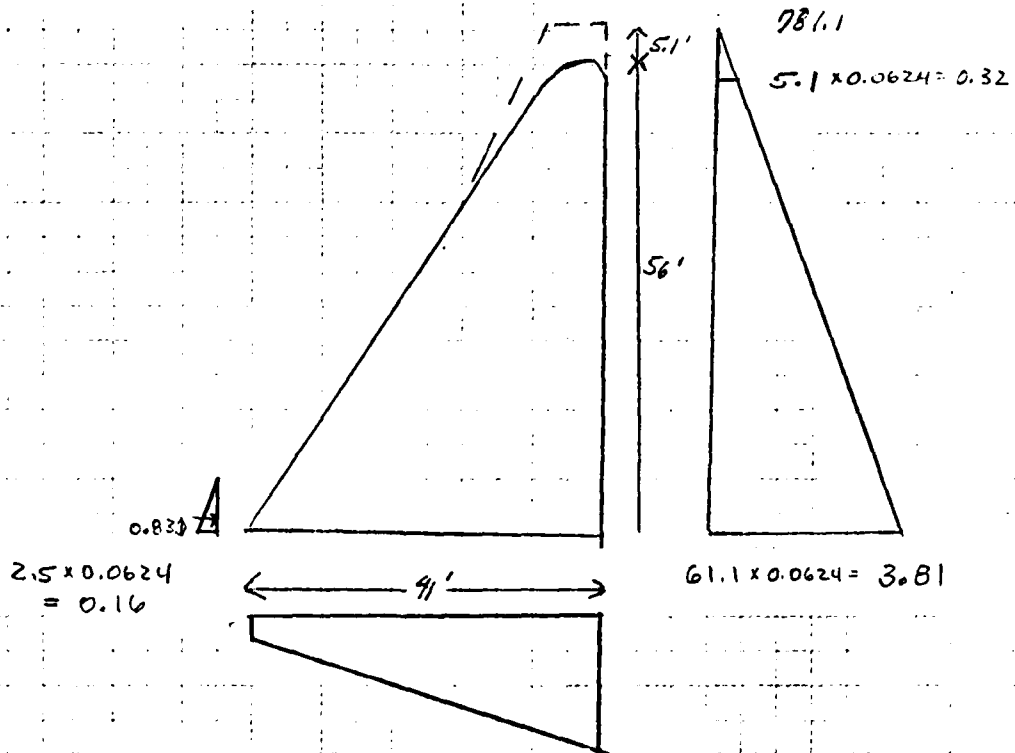
Date 8-15-30

By JJF

Ch'k. by _____

Hydrostatic Forces c) PMF

WS Elev. 781.1



$$P_H = \frac{3.81 + 0.32}{2} (56) = \frac{K}{115.62} \times \frac{MA}{20.1} = \frac{M_o}{2324.0}$$

$$u = \frac{3.81 + 0.16(41)}{2} = \frac{81.38 \quad 26.78 \quad 2179.6}{2}$$

$$P_T = \frac{1}{2} (0.16)(2.5)(0.6) = \quad 0.12 \quad 0.83 \quad \underline{0.1}$$

$$F_H = 115.5 \leftarrow$$

$$F_V = 81.38 \uparrow$$

4503.7

TAMS

Job No. 1551-06

Project NYS Dam Insp Harlow Valley Res.

Subject Stability Analysis

Sheet 6 of

Date 8-15-80

By JJF

Ch'k. by

Case I - Normal Loading - without Ice

	<u>F_V</u>	<u>F_H</u>	<u>M_R</u>	<u>M_O</u>
Dead Load	321.9		8119.8	
Hydrostatic	<u>71.8</u>	<u>98.0</u>		<u>3793.5</u>
	250.1	98.0	8119.8	3793.5

$$EM = 8119.8 - 3793.5 = 4326.3$$

$$\bar{N} = \frac{4326.3}{250.1} = 17.29$$

$$e = \frac{41}{2} - 17.29 = 3.2$$

OK - inside middle 1/3

$$p = \frac{250.1}{41} \left(1 \pm \frac{6 \times 3.2}{41} \right) \frac{1000}{144} = 42.34 \pm 19.82 = 62.2 \text{ psi Toe}$$

22.5 psi Heel

Friction Factor of Safety

$$FFS = \frac{250.1 (\tan 45^\circ)}{98.0} = 2.55 \quad \text{OK}$$

TAMS

Job No. 1551-06

Project Nys Dam Insp. - Harlem Valley Res.

Subject Stability Analysis

Sheet 7 of

Date 8-15-00

By JTF

Ch'k. by

Case II - Normal Loading - with Ice

	E_v	E_H	M_E	M_O
Dead Load	521.9↓		8119.8	
Hydrostatic Load	71.8↑	98.0←		3793.5
Ice Load		5.0←		277.5
	<u>250.1</u>	<u>103.0</u>	<u>8119.8</u>	<u>4071.0</u>

$$\Sigma M = 8119.8 - 4071.0 = 4048.8$$

$$\bar{x} = \frac{4048.8}{250.1} = 16.2$$

OK - inside center 1/3

$$\bar{e} = \frac{41}{2} - 16.2 = 4.3$$

$$P = \frac{250.1}{41} \left(1 \pm \frac{6 \times 4.3}{41} \right) \frac{1000}{144} = 42.34 \pm 26.6 = \begin{matrix} 68.9 \text{ psi Toe} \\ 15.7 \text{ psi Heel} \end{matrix}$$

Friction Factor of Safety

$$FFS = \frac{250.1 (\tan 45^\circ)}{103.0} = \underline{2.43} \quad \text{OK}$$

TAMS

Job No. 1551-06

Project NYS Dam Insp. Harlem Valley Reservoir

Subject Stability Analysis

Sheet 0 of

Date 8-15-80

By JTF

Ch'k. by

CASE III - 1/2 PMF

	<u>EV</u>	<u>FH</u>	<u>MR</u>	<u>MO</u>
Dead Load	321.9 ↓		8119.8	
Hydrostatic	75.64 ↑	108.92 ←		4204.4
	<u>246.26</u>	<u>108.92</u>	<u>8119.8</u>	<u>4204.4</u>

$$EM = 8119.2 - 4204.4 = 3914.8$$

$$\bar{X} = \frac{3914.8}{246.26} = 15.9$$

OK inside middle 1/2

$$\bar{e} = \frac{41}{2} - 15.9 = 4.6$$

$$P = \frac{246.26}{41} \left(1 \pm \frac{6 \times 4.6}{41} \right) \frac{1000}{144} = 4171 \pm 28.07 = \begin{matrix} 69.8 \text{ psi Toe} \\ 13.62 \text{ psi Heel} \end{matrix}$$

Friction Factor of Safety

$$\frac{246.26 (\tan 45)}{108.92} = \frac{2.26}{\underline{\quad}} \quad \underline{\text{OK}}$$

TAMS

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CASE IV - PMF

	<u>FV</u>	<u>FH</u>	<u>MR</u>	<u>Mo</u>
Dead Load	321.9		8119.8	
Hydrostatic	81.38 ↑	115.5 ←		4503.7
	<u>240.52</u>	<u>115.5</u>	<u>8119.8</u>	<u>4503.7</u>

$$Em = 8119.8 - 4503.7 = 3616.1$$

$$\bar{K} = \frac{3616.1}{240.52} = 15.03$$

OK - inside center 1/3

$$e = \frac{41}{2} - 15.03 = 5.47$$

$$\bar{p} = \frac{240.52}{41} \left(1 \pm \frac{6 \times 5.47}{41} \right) \frac{1000}{144} = 4074 \pm 32.6 = 73.34 \text{ psi Toe}$$

8.14 psi Heel

Friction Factor of Safety

$$\frac{240.52 (\tan 45^\circ)}{115.5} = \underline{\underline{2.08}} \quad \text{OK}$$

TAMS

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Project NYC Dam Insp - Harlem Valley Reser.

Subject Stability Analysis

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Date 8-15-80

By JJF

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Case I - Unusual Loading Earthquake

① Hydrodynamic Forces

$$P = 1.0 \times 0.05 \times 0.0624 \times (56)^2 = 9.78$$

$$m_p = (9.78)(0.4)(56) = \underline{219.08}$$

② Dynamic Forces

$$W_D = (321.9)(0.05) = 16.09$$

$$M_D = 16.09 \times 18.7 = \underline{300.5}$$

Summing Forces & Moments

	<u>F_V</u>	<u>F_H</u>	<u>M_R</u>	<u>M_D</u>
Dead Load	321.9 ↓		8119.8	
Hydrostatic	71.8 ↑	98.0 ←		3793.5
Hydrodynamic		9.78 ←		219.08
Dynamic		16.09 ←		300.5
	<u>250.1</u>	<u>123.87</u>	<u>8119.8</u>	<u>4313.08</u>

$$\Sigma M = 8119.8 - 4313.08 = 3806.7$$

$$\bar{x} = \frac{3806.7}{250.1} = 15.2$$

OK inside center 1/2

$$\bar{e} = \frac{41.0}{2} - 15.2 = 5.3$$

$$p = \frac{250.1}{41} \left(1 \pm \frac{6 \times 5.3}{41} \right) \frac{1000}{144} = 42.34 \pm 32.8 = 75.2 \text{ psi Toe}$$

$$= \underline{\underline{9.5 \text{ psi Heel}}}$$

Friction Factor of Safety

$$FFS = \frac{250.1 (\tan 45^\circ)}{123.87} = \underline{\underline{2.0}}$$

REFERENCES

APPENDIX F

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